federal register

WEDNESDAY, FEBRUARY 23, 1977

PART II

DEPARTMENT OF DEFENSE

Corps of Engineers

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ENVIRONMENTAL CONSIDERATIONS

Proposed Policies and Procedures

DEPARTMENT OF DEFENSE

Corps of Engineers

[33 CFR Parts 307, 308, 309, 310]

ENVIRONMENTAL CONSIDERATIONS

Proposed Policies and Procedures

On November 10, 1975, the Chief of Engineers promulgated a series of planning regulations to implement the guidelines published by the U.S. Water Resources Council (WRC) and approved by the President for Federal agencies to formulate plans and projects for water and related land resources (33 CFR 290–295 and 391). These WRC guidelines are known as the "Principles and Standards."

The Corps planning regulations also reflect Congressional policies on economic, social, and environmental considerations in the preservation, enhancement, development and management of the nation's water and related land resources. These laws are referenced in 33 CFR 290.

One of the important concepts of the Principles and Standards is that Federal water resource agencies must plan toward the accomplishment of two national objectives—National Economic Development (NED) and Environmental Quality (EQ). These objectives are to be given equal consideration in the planning process. Because this concept departs from the historical emphasis on economic efficiency, and because the Chief of Engineers desires to provide Corps planners with additional policies and guidance on the national Environmental Quality objective, the Chief of Engineers is proposing four regulations to supplement the initial series published in November 1975. These additional regulations are known as the "environmental series of Corps planning regulations" and provide policies for carrying out comprehensive environmental resource inventories; define approaches for describing environmental conditions for biological, cultural, physiographic and aesthetic features of a study area; provide additional guidance for formulating alternative plans which emphasize environmental quality; provide additional guidance for environmental impact assessment; and, finally, provide additional guidance on the evaluation of environmental considerations of alternative plans.

The four environmental regulations are designed to supplement the previously published regulations as follows:

33 CFR 307 supplements 33 CFR 292
33 CFR 308 supplements 33 CFR 293
33 CFR 309 supplements 33 CFR 294
33 CFR 310 supplements 33 CFR 295

The public is invited to participate in the formulation of Corps environmental planning policies and procedures by commenting on the four proposed regulations. These regulations have been provided to the U.S. Water Resources Council for review concurrently with this opportunity for comment by the public.

Comments may be submitted to the following address by 30 April 1977:

Office of The Chief of Engineers, Department of the Army, Attn.:DAEN–CWP–A, Washington, D.C. 20314.

Questions on these regulations may be referred to Mr. William J. Donovan, Chief, Plan Formulation and Evaluation Branch, Planning Division, Directorate of Civil Works, telephone (202) 693–6678.

For the public's information, the Corps of Engineers has published in the FEDERAL REGISTER other related environmental guidelines and regulations applicable to the Civil Works planning program. These are listed below:

33 CFR 305 Identification and Administration of Cultural Resources (Published under proposed rule-making on 8 September 1975). Final regulation is scheduled to be published in February or March 1977.

33 CFR 209.410 Environmental Impact Statements (Final regulation issued 8 April 1974).

Environmental Policies, Objectives, and Guidelines for the Corps of Engineers Civil Works Program (41 FR 47676), 29 October 1976.

The Corps of Engineers has determined that these regulations do not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A–107.

Dated: February 9, 1977.

For the Chief of Engineers:

MARVIN W. REES,
Colonel, Corps of Engineers,
Executive Director of Civil Works.

PART 307—ENVIRONMENTAL CONSIDERATIONS: INVENTORIES AND MONITORING

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AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778–24869, September 10, 1973.

§ 307.1 Purpose.

This regulation provides policy for carrying out comprehensive resource inventories and monitoring requirements in support of multiobjective planning. It also provides definition and guidance for depicting environmental conditions considering the biological, cultural, physiographic and esthetic feature of a study area.

§ 307.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 307.3 References.

(a) Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources* (P&S), 38 FR 24778–24869, 10 September 1973.

(b) ER 1105–2–200, Multiobjective Planning Framework (33 CFR 290).

(c) ER 1105–2–210, Plan Development Stages (33 CFR 291).

(d) ER 1105–2–220, Problem Identification (Task 1) (33 CFR 292).

(e) ER 1105–2–XXX, Identification and Administration of Cultural Resources (40 FR 41636, Sept. 8, 1975).

(f) ER 1105–2–507, Preparation and Coordination of Environmental Statements.

(g) ER 1105–2–921, System of Accounts (33 CFR 393).

(h) Technical Report E–59, "Handbook for Environmental Impact Analysis." Available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161.

§ 307.4 Definitions.

(a) "Comprehensive." The conscious consideration of a study area's environmental resources, problems and needs; the scope of which emphasizes breadth rather than depth.

(b) "Environmental Resources." Those elements, features, conditions and areas valued by man that can be characterized as physiographic, biological, cultural, and esthetic.

(c) "Resource Inventory." The locating and accounting of environmental resources of a given geographic area.

(d) "Monitoring." The sampling and measuring of one or more resource elements during the planning process required to accurately establish environmental baseline conditions. This is distinguished from monitoring of environmental parameters and processes during the operations phase of a completed project, or for the purposes of research.

(e) "Detail." Pertains to the depth to which resource elements are studied and described.

(f) "Impacts". Impacts, (also known as "effects"), are the economic, social, and environmental consequences expected to result from alternative plans. The impacts of a plan are the measured changes between with the plan and the "without" conditions.

§ 307.5 Objective of environmental resource inventory.

The underlining thrust of an environmental inventory is to establish what resources are of particular importance in an area, and where they are located. The objective of an Environmental Resource Inventory is to provide a comprehensive resource data base from which levels of significance can be established. Establishing levels of significance is an important technique to accomplish the

Environmental Quality objective in Corps planning. The earlier in the planning process that these levels of significance can be established, the better the Corps can focus on those resources requiring most consideration in formulating water resources plans.

§ 307.6 General.

An accurate, comprehensive environmental resource data base is prerequisite to effective planning for the development of water and related land resources, and for assessment and evaluation of likely environmental consequences of any proposed plan. For multiobjective planning to be effective, planners and the public must sufficiently comprehend the resources of a study area to determine their relative importance. This assures that management opportunities will be neither foregone nor inappropriately addressed during the planning process, and valuable resources will not be unknowingly lost or damaged through the implementation of a given plan.

(a) It is important that an adequate environmental resource data base be developed during the early stages of planning and refined as needed throughout the planning process. In this way, existing conditions can be recorded, planning constraints will become apparent, and the planning team should have a rational basis for recommending the need for enhancement, mitigation or replacement measures and features.

(b) The minimum environmental resource data base needed for a study is one that is sufficient to provide a useful profile of existing physiographic, biological, cultural and esthetic elements of the study area. The level of initial comprehensiveness and data detail will be dependent upon what is already known about the area. This will require searching available literature, maps, existing aerial photography, and contacting appropriate agencies, organizations, institutions and interested publics concerning available resource information inputs, as well as field reconnaissance for on-site interpretation.

(c) The initial environmental resources data base should strive to acquire the maximum level of detail and scope that present knowledge and existing data can provide for the study area, while recognizing the need for establishing data propriety and such constraints as funding and time limitations. This approach allows for early identification of areas of particular significance, data credibility and deficiencies, and for involving the public in the planning process.

(d) Professional judgment and public involvement are required to produce useful planning information, since without appropriate constraints being applied, environmental resource inventories could be carried to extremes inconsistent with established needs. Provision should be made for the inventory process to be halted at any planning stage until the need for greater detail is demonstrated.

§ 307.7 Policy.

(a) Resource inventories shall be conducted for all survey-scope investigations, and, as appropriate, for special studies and studies conducted under the Continuing Authorities Program (ER 1105–2–50).

(b) Resource inventories shall be conducted in sufficient detail and scope to determine scarcity of resources, their national, regional or local significance; and to determine the potential or necessity for improving, protecting or mitigating for losses of resources affected by alternative actions.

(c) Resource inventory data developed during planning studies will be appropriately stored to accommodate efficient and timely future retrieval and updating. To the extent practicable, the design and management of the data handling system should provide for retrieving information in response to public requests.

§ 307.8 Planning Considerations.

The notion of a comprehensive resource inventory implies the collection, interpretation, and display of baseline data needed for addressing the four planning concerns specified by the *Principles and Standards* (P&S) and Section 209, Public Law 91–611; these concerns are National Economic Development (NED), Environmental Quality (EQ), Regional Development (RD), and Social Well Being (SWB). The establishment of the four accounts, as defined in ER 1105–2–921, further implies that there are resource data needs particular to each; the collection of data for one concern does not necessarily provide the needs for all. While much of the baseline data collected during the conduct of an environmental inventory may provide useful information for addressing NED, SWB and RD considerations, the conduct of an "environmental inventory" under the guidance of this regulation addresses the essential components of the EQ account, and is not intended to be all inclusive of the data needs necessary for addressing the full range of planning concerns. Consequently, the planning team should understand and consider the requirements (objectives) of each account in order to determine, to the extent possible, the resource data needs for each, so that the undertaking of social, economic and environmental surveys constitute a comprehensive approach to the overall resource inventory.

§ 307.9 Conducting the environmental resource inventory.

The initial resource inventory, prepared during the Plan of Study (POS) stage of the planning process, provides a comprehensive overview of the resource base of a study area. Appendix A categorizes those resources which serve to define the scope of data collection of an environmental resources inventory. Because of the wide spectrum covered, it is an effective checklist. If this checklist is used essentially as a guide during the environmental inventory process for a given study area, it will minimize the possibility of overlooking significant environmental resources. A Department of the Army publication (Technical Report E–59) entitled, "Handbook for Environmental Impact Analysis," prepared by CERL, is another useful information source for determining appropriate environmental resource components for inclusion in a comprehensive resource inventory.

(a) The inventory should begin by compiling data from known documents and sources, including the interpretation of existing aerial photography. This should be followed by seeking additional information and expanding the compilation by coordination with appropriate segments of the public, including Federal, state, and local agency personnel, University staff and research groups, other professionals, environmental groups and public interest organizations. Such an orderly data gathering and refinement process gives a reasonable degree of assurance that all known data gaps and deficiencies have been identified.

(b) Beyond the initial inventory, the emphasis should be placed on obtaining the appropriate detail for the resources previously identified, and determining their level of significance. In addition, as management resources and alternatives are eliminated from further consideration later in the planning process, it should be increasingly obvious which environmental resources require more indepth analysis.

§ 307.10 Integration to the planning process.

The planning process consists essentially of three stages, during each of which the planning team addresses the four functional planning tasks. The planning stages and functional planning tasks are outlined in considerable detail throughout the 1105–2–200 series. Figure 1 of ER 1105–2–200 depicts the general relationship of the Plan Development Stages and the Functional Planning Tasks. This section will explain where and how the inventory and monitoring processes relate to the three stages and the four tasks. This explanation will include the concept that the inventory process begins with a preliminary gross appraisal of the study area. This basic inventory is then progressively intensified in terms of quality and quantity to guide the planning process through the various stages.

(a) *Stage 1—Development of Plan Study (POS).* (1) The planning team will establish tentative geographic boundaries for the planning area. Initially, these will be the study area limits. However, since certain environmental resources are highly mobile and, therefore, do not occupy the same geographical area all of the time, it may be necessary to extend the study for area boundaries for those resources far beyond that of

others. For example, inventory boundaries for biological resources may be greater than that refined for cultural elements. Paragraphs 7a and 7b, ER 1105-2-220 discuss how and when the study area boundaries may be modified as the study progresses.

(2) At the POS stage, the planning team is attempting to achieve at least a gross appraisal of the study area. The inventory at this stage is, at a minimum, a "broad brush" first approximation compilation of those natural and man-made features and conditions that constitute the study area's environment. Every attempt will be made to assure that this initial compilation is comprehensive, as defined in paragraph 4a. Additionally, every effort should be made to inventory those features and conditions which have outstanding physiographic, biological, cultural, and esthetic value. The intent, therefore, is to determine, as early as possible, those resources which should be preserved, enhanced, protected, or approached with care. Even though planners should be particularly concerned with identifying those resources having at least state-wide significance, features having lesser levels of significance must be considered as well, since local values often dictate whether or not a program or plan is acceptable. Another purpose of this initial activity is to identify data gaps and deficiencies and to determine if a monitoring program of selected resource components needs to be initiated to establish baseline conditions. The information and efforts required to fill these gaps will be collected and conducted during subsequent stages of pre-authorization and post authorization planning; however, strategies for accomplishing this should be formulated at the earliest possible date.

(3) A performance evaluation of the resource inventory effort during Stage 1 planning should be made to determine:

(i) Its comprehensiveness.

(ii) The extent of data deficiencies.

(iii) The need for future resource inventory effort (detail, scope and depth).

(iv) Additional work required to establish levels of significance for components inventoried.

(4) Section 307.12 and Appendix B discuss examples for displaying environmental resources information.

(b) *Stage 2—Development of Intermediate Plans.* (1) To accommodate the activities of this stage, more detailed problem identification shall be continued to define more precisely the planning objectives. In addition, steps should be taken to correct deficiencies in the data base. As the emphasis shifts to formulation of alternatives, the planning team should be aware that the inventory process and data requirements also may need redirection.

(2) As alternative plans are formulated, based on the results of the POS stage and public input, the planning team should begin to determine which resources may be affected and which ones probably will not be affected. The task then is to concentrate efforts on more detailed investigations of those individual resource elements and ecosystems which probably will be impacted by alternative plans. Study boundaries may be adjusted as suggested in § 307.9a. The intent during this stage of the planning process is to develop a resource information base sufficient to identify all significant effects of the alternative plans under consideration. Since detailed plans have not yet materialized, the planning team should not strive for too much detail for any one feature, condition, or resource unless such data is readily available. Such detail may later prove to be unnecessary, unless the planner or the public identifies certain areas or features that would be impacted by almost any measures envisioned to address one or more of the planning objectives.

(3) A few examples of the minimum detail desired for the various resources during the second planning stage are given in Appendix C.

(4) Since some plans may fall out for various reasons, it is not wise to expand a great deal of time and effort trying to identify all possible impacts of all alternatives. This analysis should be reserved for the next stage in the planning process.

(c) *Stage 3—Development of Detailed Plans.* Stages 1 and 2 required, as a minimum, a comprehensive overview of the study area's resource base, data deficiencies, and efforts designed to determine levels of significance. By stage 3, the inventory should be sufficiently comprehensive that only more detailed levels of significance are required. For example, whereas stage 2 identified specific habitat types and their general significance, stage 3 attempts to attach more exacting values and signifiance to each major habitat determined to be altered or impacted by alternative plans. The level of detail required will depend on the significance of anticipated impacts. Determining this will depend largely on professional judgment. Some examples of the minimum detail desired for the various resources at this stage are given in Appendix C.

§ 307.11 Sources of information.

A Corps planning team cannot develop all of the data and information needed for a study without outside assistance. Other agencies, organizations and the general public need to be contacted for their expertise, data inputs and evaluations. For example, a State Fish and Game agency should be contacted for information on fish and wildlife resources in a given study area, and for related biological information. However, the emphasis is for the planning team to build upon the generalized list of sources given in ER 1105-2-220 with a view towards identifying informational constraints of each source. In other words, each source can best supply only certain aspects of the total information needed to complete the study. Additionally, when soliciting information from a source, the intent is to be specific as to data needs desired from that source. A complementary purpose for contacting various segments of the public for possible data inputs is to encourage public involvement, giving the public an opportunity to become involved in the planning process, in addition to obtaining useful data.

§ 307.12 Data display techniques.

Data displays can be very effective visual aids during planning, particularly when dealing with the public. No one technique will suffice for all needs. Therefore, a combination of display techniques may be more appropriate.

(a) Prime consideration should be given to constructing a photomosaic of the entire study area or appropriate subdivision thereof. Existing stereo aerial photography is readily available for most areas of the country from Federal, State and local agencies. The photomosaic can serve as a meaningful base map to which the public can relate and over which resource components suggested in Appendix A, and discussed above, can be depicted on mylar overlays. Those elements checked in Appendix A are actually visible on the photograph itself. The photomosaic serves as a visual résumé of the features depicted and their interrelationships. It also helps to identify areas of concern that need more detailed study. Additional information on ordering aerial photography and how it can serve as a display technique is given in Appendix B.

(b) Certain display methods lend themselves better to understanding one resource than another. In addition, one resource may be better displayed by one technique early in the inventory process and by a different technique later on. For example, the extent of major vegetation associations would best be shown on overlays to a basic photomosaic map of the study area or a portion of the area under study. At a later stage of the planning process, after major ecosystems have been identified and one wants to display the plant and animal species present, tabulations could well be the best method to use. In other cases it might be best to use graphs as a display method. An example of this method would be to display stage discharges, flood peaks, or annual flows of a stream in the study area.

(c) Other display techniques which may be used during the planning process include perspective drawings, physical or scale models, overhead projection transparencies, 35mm color slides, and photographs of the study area and completed water resource projects that are similar to plans being proposed. These are all valuable in helping the public visualize the resources involved and engineering works and/or nonstructural solutions under consideration. The choice of technique to be used in any particular situation is a judgmental factor which must be exercised by the planner.

§ 307.13 Inventory storage and retrieval.

Data collected during the inventory process should be stored in such a manner as to allow easy access updating and retrieval. Since experience has shown that other agencies, organizations and

institutions often require the same data for their purposes, the storage system should be responsive to their potential user needs as well. This will require that inventory information is systematically indexed and appropriately filed by subject matter and geographic location.

§ 307.14 Scope of investigations.

The comprehensiveness of inventory requirements defined in this regulation have been oriented especially toward Level C survey investigations. Naturally, time and funding limitations for studies of lesser scope will result in inventories which are somewhat lesser in scope and detail. Thus, interpretation and judgment by the planning team, based on public and agency involvement, is required in order to assure that the inventory is complete enough to permit necessary planning decisions to be made.

§ 307.15 Effective date.

This regulation is effective, as published in the FEDERAL REGISTER on that date and codified as 33 CFR Part 307.

APPENDIX A—ELEMENTS FOR CONSIDERATION IN CONDUCTING A COMPREHENSIVE ENVIRONMENTAL RESOURCES INVENTORY

The elements listed below represent classes of: (1) water and related resources and amenities (both natural and man-made) which comprise man's physiographic, biological, and cultural environments; and (2) environmental problems and hazard areas. The list should be considered evolutionary in nature as it will be open to continuous updating based on experience and improved environmental understanding. An environmental inventory should represent the values not only of the Corps of Engineers, but also of others who are knowledgeable and concerned about the environmental resources, amenities and problems of the area. Therefore, the quality, completeness and utility of an inventory will reflect the willingness and cooperation of those agencies, groups, organizations and individuals responsible or concerned about the environmental resources in the study area. It also follows that, since the environment is made up of an aggregate of resource elements rather than individual components, a meaningful environmental resources inventory should strive to combine, as appropriate, those elements and features that best depict environmental parameters and systems.

I. PHYSIOGRAPHIC ELEMENTS

A. *Geologic* Landforms:

+ Canyons, gorges
+ Distinctive mountain features (peaks, hills, buttes, etc.)
+ Cliffs, palisades, bluffs, rims
+ Rock formations: balanced rocks, bridge, spires, castle rocks
+ Soils
(+) Linears
+ Evidence of volcanic activity (volcanoes, lava flows, igneous features, etc.)
(+) Glaciers, and glacial features; e.g., moraines, kames, eskers, drumlins, cirques, boulders and/or boulder fields
(+) Riverine features (deltas, sand bars, flood plain, etc.)
Fossil evidence, petrified wood
Unusual exposed minerals
Caverns, caves
(+) Salt flats
+ Badlands
(+) Water-land interfaces (coastlines, beaches, lakeshores)
(+) Islands
(+) Reefs
(+) Dunes
Other

B. *Hydrologic*

Climatology
+ Surface drainage
Ground water
(+) Lakes
+ Ponds
(+) Bays
(+) Lagoons
(+) Free-flowing rivers, streams, segments thereof
+ Whitewater stretches.
(+) Estuarine marshes, bogs, swamps
(+) Inland marshes, bogs, swamps
+ Aquifer recharge areas
+ Springs
Geysers
+ Waterfalls, reversing falls
Other

+ Visible on 1:120,000 or larger scale aerial photography.
(+) Visible on LANDSAT imagery and aerial photography.

II. BIOLOGICAL ELEMENTS

A *Botanical*

(+) Land cover
Rare, remnant or unique species, specimens, stands or communities
Virgin stands
Climax communities
Vegetation types unusual to region
Habitats of important native plants

B. *Zoological*

1. *Terrestrial animals:* Habitats (critical and otherwise), migratory routes, breeding resting, wintering grounds of threatened, endangered, unique or otherwise significant species or communities.

2. *Ornithological:* Habitats (critical and otherwise), migratory routes, breeding grounds, roosting sites, feeding-nesting areas of rare, endangered, unique or otherwise significant species or communities.

3. *Aquatic:* Marine, estuarine and freshwater habitats (critical and otherwise), anadromous routes, spawning grounds, feeding areas, nursery areas, and other features relating to significant species of fin and shellfish, including rare and endangered species.

C. *Life Zones/Biomes and Other Ecologically Significant Areas Not Identified Above.*

III. CULTURAL ELEMENTS

A. *Archeological*

Pictographs, petroglyphs
Burial grounds, mounds
Village sites, ruins, artifact sites
Other

B. *Historical*

Historical sites and districts, monuments, structures and buildings
Transportation features: trails, canals and bridges
Old communities or areas retaining character of historical background
Other

C. *Paleontological*

Fossil remains
Petrified wood
Pollen analysis
Other

D. *Contemporary* (Those features which reflect man's current values, activities, styles of life, social events)

Architectural and engineering works
Sites of fairs, festivals, art and musical events and other cultural activities
Ethnic colonies: For example, Creole, Amish, Indian settlements
Other

IV. LAND USE

A. *Urban and Built-Up Land*

+ Residential
+ Commercial and Services
+ Industrial
(+) Extractive
(+) Transportation, Communications and Utilities
(+) Open space

B. *Rural Land*

(+) Cropland and pasture—general
Prime or potential prime agriculture land—specific
(+) Forest land—general
Prime or potential prime forest land—specific

C. *Environmental Use or Management Areas*

1. Federal, State, local or private land or water areas which have been formally and/or legally designated for some conservation or environment-related purpose:

Parks
Forests
Seashores
Scenic roads and trails
Wild and scenic rivers
Wildlife preserves and refuges
Nature trails, arboretums
Open and green space
Research or educational areas
Outdoor recreation areas
Etc.

2. Land and water areas, as above, which have been identified but have not been formally or legally designated or developed.

V. ENVIRONMENTAL PROBLEM OR HAZARD AREAS

These would comprise significant environmental problem areas which represent possible opportunities for environmental enhancement or restoration, and particular hazard areas that should be considered and approached with care during the planning of water and related land resources development.

A. *Problem Areas*

(+) Shoreline or streambank erosion
(+) Strip mine areas
+ Eutrophication
+ Noxious weeds
Pollution (sediment, chemical organic, thermal, radiation)
Water related disease vectors or other health problems
Air pollution
Noise pollution
Other

B. *Hazard Areas*

+ Flood-prone areas
Fire-prone areas
+ Landslide-prone areas
+ Mudslide-prone areas
Highly seismic areas
Volcanic-prone areas
Hurricane-prone areas

APPENDIX B—SELECTED DISPLAY TECHNIQUES

1. Aerial photography can play a significant, useful, and cost-effective, role as a display medium and information source for the resource inventory (90% of the United States has been photographed). Many areas have been covered within the last 5 years. Even if the most recent existing photography is over 10 years old, it may still be quite useful for gaining an understanding of undeveloped areas. Often the existing photography is more recent than the latest maps. Satellite imagery (LANDSAT) is available for the entire U.S. on a continuing basis.

2. Aerial photography can serve as a useful means to display the resource inventory data. Aerial photography is often available at the same scale for the entire study area; whereas, available maps will often vary in scale and information content from one part of the study area to another. Most people can relate to aerial photography more readily than to maps. The ability to actually see the feature in a photograph has much more credibility than a mark on a map. Large scale photography can be mosaicked together to form a base map of the study area. If high resolution small scale and mosaicked to form the base for the display. LANDSAT data can serve as a display for large areas. The elements and features can then be readily delineated on mylar overlays. If something has changed since the photography was taken (e.g., urban sprawl), this change can be depicted on the overlay. Figure B–1 is an example of such a dsplay reduced to fit on an 8x10½" page. The original scale was 1:20,000. The appropriate scale for the display depends on the size of the study area. For a 400 square mile area, a 1:20,000 5 ft. by 6 ft. board would probably be the largest scale desirable.

3. Aerial photography is also a valuable information source. The elements checked in Appendix A are those that are visible on black and white, color, or color infrared 1:120,000 or larger scale stereo aerial photography. Color photography allows for easier interpretation and color infrared is especially good for discriminating vegetation types. Black and white photography is the cheapest and most readily available. For large study areas, LANDSAT data can provide much useful information if the LANDSAT digital data is properly computer processed. Those elements checked with parentheses are identifiable from LANDSAT data.

4. In addition to simple identification of elements and features, an interdisciplinary team of trained photointerpreters can gain a general understanding of the complex environmental, economic, and social interrelationships in the study area. The planning team can identify major problem areas and estimate possible environmental, social and economic impacts of various alternatives. The stereo photography and photomosaic provides an excellent basis for the multidisciplinary planning team to initiate a study. It also assists in locating areas that require field reconnaissance and monitoring.

5. In many areas historical aerial photography exists for several dates in the past. This allows for identification of changes and trends (e.g., erosion, accretion, urban sprawl, and river course changes). Such historical information is often valuable for predicting the "future without" condition and for educating the public.

6. Existing aerial photography is available from several Federal sources that have efficient indexing systems allowing for quick determination of whether useful photography is available:

FIGURE B–1

(To be added at a later date.)

Aerial Photography Field Office, Administrative Services Division, ASCS–USDA, 2506 Parley's Way, Salt Lake City, Utah 84109.

U.S. Soil Conservation Service, Department of Agriculture, Federal Center, East-West Highway and Belcrest Road, Hyattsville, Maryland 20781.

U.S. Forest Service, Department of Agriculture, Washington, D.C. 20250.

User Services Unit, EROS Data Center, Sioux Falls, South Dakota 57198; Phone: 605–594–6511 X 151; FTS: 605–594–6151.

Bureau of Land Management, Department of the Interior, Washington, D.C. 20240.

National Cartographic Information Center, Department of the Interior, 507 National Center, Reston, Virginia 22092; Phone: 703–860–6051.

Cartographic Archives Division, National Archives, Washington, D.C. 20408.

National Ocean Survey, Department of Commerce, Washington Science Center, Rockville, Maryland 20852.

Tennessee Valley Authority, Maps and Surveys Branch, 210 Haney Building, Chattanooga, Tennessee 37401.

U.S. Army Engineering Topographic Laboratories, Attn: ETL–RI–RS, Ft. Belvoir, Virginia 22060; Phone: 703–664–3736.

7. The cost for a 9" x 9" black and white contact print is approximately $2.00. The time from order to receipt of the imagery ranges from 4 to 10 weeks.

8. The U.S. Geological Survey prepares an annual status map of aerial photography of the United States.

9. The U.S. Fish and Wildlife Service has recently prepared an index of recent photography of the wetlands of the United States. This index is available upon request by writing:

Wetlands Group, Office of Biological Services, Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

10. Satellite imagery is available from the Engineering Topographic Laboratories and the EROS Data Center. The EROS Data Center also provides computer compatible tapes of the LANDSAT digital data.

APPENDIX C—EXAMPLES OF DETAIL FOR ENVIRONMENTAL INVENTORIES

1. *Stage 1—Plan of Study.* Some general examples of items to consider and the level of detail envisioned at this stage are broad land use and land cover data including:

a. Identification and location of public recreation areas;

b. Identification of designated or proposed wild and scenic rivers, boundaries of known delicate or scarce ecosystem(s);

c. Plant and/or animal communities far removed or separated from their normal ranges (outliers);

d. Geologic formations and/or vegetative associations that form a worthwhile contribution to esthetics;

e. Recognized archaeological and historical places; and

f. Readily apparent problem and hazard areas.

2. *Stage 2—Intermediate Plans.* a. *Water Resources.* This stage of planning might result in a classification of the streams, rivers and lakes, giving their approximate mileage and size, water quality, and how this relates to existing and proposed state criteria; the identification of species of aquatic life present, the presence of rare, threatened or endangered species, including their critical habitats, and other documentation of a similar scope. Late in this stage it should become apparent which hydrologic elements may be affected by measures being considered and plans being formulated. Therefore, monitoring of appropriate water quality and aquatic community parameters should be started during this stage, if such data are needed and are not available, or if monitoring has not been started earlier. Such procedures also apply to any feature of the environment subject to dynamic seasonal changes where established base conditions for these features are lacking, but are considered necessary to impact assessment.

b. *Land Resources.* A typical exercise of studies for vegetation is to analyze each major cover type identified during the POS stage. This analysis identifies areas of specific habitat type within each cover type. Animal associations may be recorded in conjunction with vegetation studies. In the POS stage, the predominant species of species associations of each cover type will probably have been identified. During Stage 2, the rest of the major species and/or communities of plants and animals should be treated accordingly. It is stressed, however, that the emphasis should be or qualitatively describing these resources and their association rather than strictly a tabulation exercise (i.e., species lists). Therefore, the planner should strive to determine the actual or possible existence of threatened, endangered or otherwise significant species of plants and animals, their critical habitat, and other related elements that require careful analysis and evaluation within the study area. By the end of this stage, when the alternative plans are formulated, it should become apparent which portions of the study area will require more indepth studies for further analysis.

c. *Cultural Resources.* Emphasis during this stage should be on a "cultural resources reconnaissance" as defined in ER 1105–2–460. The actual literature search and records review may have begun during the POS stage and, if so, is completed here, along with initiation of necessary field work.

3. *Stage 3—Detailed Plans.* a. *Water Resources.* The key to the level of investors at this stage is sufficient detail to enable the planning team to perform adequately the tasks of impact assessment and evaluation. For a physical resource such a river, detailed analysis might include such information as all the critical physical dimensions, bed characteristics, prior modifications to the channel, water quality and biological components (including data obtained from monitoring), its regional significance and unique and/or special attributes.

b. *Land Resources.* For vegetation, some items to consider would be detailed information on specific characteristics and significance of the habitat or cover types identified during the previous stage. Other information might include more precise delineation of critical environmental areas elasticity (tolerance) to modification or outside influences. Again, this detailed analysis will address any and all resources and aspects of those resources which may be affected by any detailed plan under consideration.

c. *Cultural Resources.* Information provided on cultural resources from the Stage 2 reconnaissance will most likely provide sufficient detail to adequately assess and evaluate potential impacts from proposed alternative plans. Consequently, depending on the relative significance of the cultural resource and degree of impact, it should seldom be necessary to conduct additional studies and analysis which go beyond the scope of the cultural resource reconnaissance. In addition, planning can begin on possible mitigation strategies, possible salvage techniques, and future research needs.

PART 308—ENVIRONMENTAL CONSIDERATIONS: FORMULATION OF ALTERNATIVES

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Appendix A—Management Measures

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778–24869, September 10, 1973.

§ 308.1 Purpose.

This regulation provides specific guidance for formulating alternative plans which emphasize environmental quality as an extension of ER 1105–2–230.

§ 308.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 308.3 References.

(a) Public Law 91–190, *National Environmental Policy Act of 1969*, (83 Stat. 852).

(b) Water Resources Council, *Principles and Standards for Planning Water and Related Land Resources*, 38 FR 24778–24869, 10 September 1973.

(c) ER 1105–2–200, Multiobjective Planning Framework (33 CFR 290).

(d) ER 1105–2–210, Plan Development Stages (33 CFR 291).

(e) ER 1105–2–220, Problem Identification (Task 1) (33 CFR 292).

(f) ER 1105–2–230, Formulation of Alternatives (Task 2) (33 CFR 293).

(g) ER 1105–2–250, Evaluation (Task 4) (33 CFR 295).

(h) ER 1105–2–XXX, Identification and Administration of Cultural Resources (40 FR 41636, Sept. 8, 1975).

§ 308.4 Definitions.

The definitions presented in paragraph 4, ER 1105–2–200 are applicable to this regulation.

§ 308.5 General.

The explicit consideration of environmental quality in formulating plans for the management of the Nation's water and related land resources provides opportunity for significant enhancement of the quality of the environment. The planning process requires that plans be directed to meet current and projected needs and problems in a positive manner, specifically, that improved contributions are made to society's preferences for environmental quality as recognized by the Water Resources Council (WRC) Principles and Standards (P&S). The planning process will not merely display environmental impacts and determine mitigation measures for adverse impacts resulting from plans.

§ 308.6 Relationship to NEPA.

The policy contained in the National Environmental Policy Act of 1969 (NEPA) is to use all practicable means and measures to foster and promote the general welfare, create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans. This policy defines an all-encompassing concept of environment which is addressed by the multi-objective planning process, described in ER 1105–2–200. The P&S requires that the significant impacts of a proposed action on the environment be measured or otherwise concisely executed and the results displayed or accounted for in terms of contributions to four accounts: National Economic Development (NED), Environmental Quality (EQ), Regional Development (RD), and Social Well-Being (SWB).

§ 308.7 National EQ objective.

The EQ objective, as defined by the P&S, is to enhance the quality of the environment by the management, conservation, preservation, creation, restoration or improvement of the quality of certain natural and cultural resources and ecological systems. This objective reflects society's concern and emphasis for the natural environment and its maintenance and enhancement as a source of present enjoyment and a heritage for future generations. It also reflects man's abiding concern with the quality of the natural physical-biological system in which all life is sustained.

(a) Beneficial contributions to the EQ account include the following:

(1) Management, protection, enhancement, or creation of areas of natural beauty and human enjoyment such as open and green space, wild and scenic rivers, lakes, beaches, shores, mountains and wilderness areas, and estuaries.

(2) Management, preservation, or enhancement of especially valuable or outstanding archeological, historical, biological (including fish and wildlife habitat), and geological resources and ecological systems;

(3) Enhancement of quality aspects of water, land, and air by control of pollution or prevention of erosion and restoration of eroded areas;

(4) Avoiding irreversible commitments of resources to future uses. While all forms of development and use affect and sometimes change the tenuous balance of fragile aquatic and terrestrial ecosystems, the implication of all possible effects and changes on such systems is imperfectly understood at the present time. This is especially important with respect to uses of energy which have many far reaching indirect environmental impacts.

(5) Given its broad and pervasive nature, it is not practical to specifically identify all possible components of the environmental quality objective. If other components are recognized, they should be explicitly identified and accommodated in the planning process.

§ 308.8 Consideration of the environment in the determination of planning objectives.

Planning objectives must be established to carry out plan formulation. Establishing these planning objectives involves analyzing the range of public and professional concerns expressed about the use of water and related land resources in the study area to translate them into specific objectives for the study. Planning objectives are first established during the first stage of the planning process; but are often refined and modified during the second and third stages.

(a) The planning objectives will not be identified with or translated into either national objectives or the four accounts. Impacts caused by any measure can have contributions to one or more of the accounts. As an example, an objective might be to provide certain recreational opportunities on an area of open land which has previously been cleared. To achieve this objective a park could be created. The impacts of this action could provide positive contributions to the SWB and NED accounts by providing recreational opportunities and economic output resulting from visitation, respectively. The creation of wildlife habitat and improved aesthetics on the cleared land would be beneficial contributions to the EQ account. If the park were developed in a natural area of high aesthetic and wildlife habitat value, adverse effects to components of the EQ account might result.

(b) The objectives may reflect a variety of uses to which the water and related land resources can be placed. Objectives will represent the views of various publics as determined through the public involvement program. Specific objectives may be in conflict, but the full range of objectives should be set forth as a basis for initial formulation.

(c) Early in the planning process, planning objectives are likely to be relatively large in number. While the study authority may direct attention to specific concerns, the authority should not be interpreted as limiting early consideration of any appropriate planning objective.

(d) The planning objectives should be specified to that level of detail sufficient to provide a precise description of each, including where and when it is to be achieved. An objective of maximizing acres of wildlife habitat is not a specific planning objective and, if used, could lead to a publicly unacceptable alternative of removing urban development from a basin to increase habitat. An objective of maximizing urban development on water related lands is not specific and could lead to an alternative that would eliminate all wild and scenic areas and, therefore, be publicly unacceptable because of the adverse environmental impacts. The reasonableness of the plans formulated is dependent upon detailed, specific and attainable planning objectives which have public support. Limits should be placed on the planning objectives to insure reasonableness (see paras 11 and 12, of Part 310 of this chapter, for definition of reasonableness).

(e) The level of outputs resulting from management measures are variable because of the nature and sizing of management measures. If possible, output levels should not be a factor in establishing planning objectives since that

would predetermine the levels of outputs to be produced. Specific output levels can be used, however, to specify limits and should be used if the limits are critical to the objective. If ten acres of a certain critical habitat exist, which if decreased by any amount would lose their effectiveness, an appropriate objective would be to "preserve the ten acres of critical habitat". If the net recreational demand in an area has been determined to be 30,000 recreation days per year, the objective "to provide recreational opportunities along Y creek, not to exceed 30,000 recreation days per year" would be appropriate as a planning obective. It would not be appropriate to assign any predetermined level of fulfillment as the planning objective such as "to provide 20,000 recreation days per year along Y creek". Addressing an objective to a lesser degree than that which is the maximum desired will not be construed as a failure to provide for the planning objective.

(f) Planning objectives should specify the needs rather than an initial determination of a technical solution. To "provide a flood control levee along Y creek" would not be an appropriate planning objective because it predetermines that the solution to a problem of flood damage reduction is a structural solution, specifically a flood control levee.

(g) Environmental problems, needs and concerns should exist in every study area. These can be translated into planning obectives. Their solution would provide, by their very nature, positive contributions to the EQ account.

(h) To achieve the most complete identification of planning objectives, a multidisciplinary team should conduct the problem identification task of the planning process with full public coordination.

(i) An activity of the problem identification task of the planning process is to establish the planning objectives. As planning progresses, the planning objectives must be continuously reanalyzed and refined in order that a manageable and well defined set is specified prior to developing the detailed alternative plans.

(j) In the later iterations of the planning tasks, specific objectives will be eliminated from consideration if, through the planning task of evaluation, the planner determines that there are no net positive contributions to the NED and EQ accounts which result from alternative plans formulated to accomplish the objectives. For example, if flood damage reduction in a specific area would not provide net positive impacts on any EQ resources and would not be economically justified, the objective of providing the flood damage reduction would be eliminated. Of course, avoiding SWB and RD adversities or enhancing SWB and RD at no loss to EQ and NED is always valid. As an example, assume that providing a hospital on specific water related lands provides no positive contributions to the EQ or NED accounts. If a proposed channel alignment could preserve the proposed site or could contribute to the development of the hospital by providing fill material, the concerns regarding the hospital site should be retained in the planning process.

§ 308.9 Independence of planning objectives.

A planning objective becomes independent if all of the measures for addressing it are unrelated to measures addressing any other planning objective; i.e., the solution(s) to one planning objective does not affect the solutions to any other planning objective. As the number of potential alternatives is reduced in the iterations of the planning tasks, the possibility of isolating and identifying independent planning objectives is increased.

(a) An objective that can be met only by measures which are not within the Corps' authority to implement should be identified during the task of evaluation; and then a management decision made with DAEN–CWP approval to either include or exclude the specific objective for further considerations. This management decision is based on many factors which include the study authority, public perception of the study and objectives, availability of study funds, size of the study area, authorities of other agencies, costs of continuing that part of the study, in-house expertise, and the contributions that the Corps could make toward fulfilling the objective.

(b) A hypothetical example of the preceding concept could occur in a drainage basin that has needs for flood damage reduction and for water quality enhancement. Through the process of elimination it has been determined that the objective of flood damage reduction can only be addressed by alternative plans of structural and non-structural measures in a localized urban area. It has also been determined that the objective of water quality enhancement can be met only with alternative combinations of wastewater treatment measures in a different location in the basin and which are being considered by another agency. If, in the planning task of evaluation, it is determined that measures for each objective would not affect the other objective, then the water quality objective could be eliminated from further consideration since implementation of the measures to fulfill the objective are not within the Corps' authority.

§ 308.10 Environmental constraints.

Establishing planning objectives may reflect that given concerns, not necessarily directly related to either NED or EQ, could be so important as to impose environmental constraints on the planning process. These constraints may be of such importance that to violate them would compromise the validity of the entire planning effort.

(a) Environmental constraints must be incorporated in the formulation of all alternative plans before the alternative plans can be considered viable. The significance of the constraints is that they may not be traded off in the final trade-off analysis.

(b) Environmental constraints should be specific to both the study area and the potential actions involved. The constraints may also be imposed at the Federal, state, or local levels. An example of a Federal constraint is the Wild and Scenic Rivers Act of 1968 (Public Law 90–542) which states that no department or agency of the United States shall recommend authorization of any water resource project that would have a direct and adverse effect on the values for which a river was established as a component of the national wild and scenic rivers system. A state or local constraint may be the protection of certain wetland areas as set forth by legislative action.

(c) Constraints may preclude specific significant adverse environmental impacts so that alternative plans will be acceptable. As an example, local concerns may insist on preserving a particular stand of trees adjacent to a creek and any partial mitigation measures for their loss would be publicly unacceptable. This would then be a constraint on the planning process which would guarantee against the loss of the trees.

(d) Constraints may also require that certain adverse impacts be mitigated before alternative plans can be considered implementable. As an example, destruction or degradation of archeological or historical sites, eligible for nomination to or listed on the National Register of Historic Places, will not occur without proper mitigation as specified in a signed Memorandum of Agreement between the Corps, the National Park Service, the Advisory Council on Historic Preservation and the State Historic Preservation Officer (see 40 FR 41636, Sept. 8, 1975).

(e) Legal or public policy constraints should be used judiciously in the determination of the "most probable" alternative future and in the formulation of alternative plans. In specific cases, an existing legal constraint may be consciously disregarded if the study proposes to recommend a change or demonstrates the probability of a change.

(f) Local cost sharing shall not be considered a constraint when formulating alternative plans.

§ 308.11 Formulation.

Formulation of alternative plans is the development of different resource management plans to address planning objectives. To help insure that the best overall plan is developed, a range of alternative plans will be developed based on different sets of formulation and reformulation criteria. Alternative plans will be formulated to provide for different combinations of the objectives, including those objectives which reflect environmental problems and needs. Therefore, addressing objectives that reflect environmental concerns is essential to carrying out the multiobjective planning framework.

§ 308.12 Identify management measures.

A wide variety of technical and institutional means exist for managing resources (see App A). As the basis for formulating alternative plans, a broad range of these means should be examined to identify those which can address one or more of the planning objectives.

Management measures are concerned with the management of water and related land resources and include policies, programs, technologies, engineering inputs, institutional arrangements, and structural and non-structural implementation schemes.

(a) The identification of management measures should be done by a multidisciplinary team. Team members must have expertise in the resources involved and with measures used in satisfying the specific planning objectives. The identification of measures proposed or suggested by other Federal and state agencies, interest groups and publics is also essential.

(b) The list of measures should be categorized by the planning objective or combinations of planning objectives that each measure addresses. Possible conflicts that exist among the measures should also be identified.

(c) Non-structural measures will be considered as thoroughly as structural measures. They may provide varying levels of objective fulfillment and need not meet objectives to the same degree as a structural alternative. They may also offer an opportunity to fulfill a significant level of an objective in conjunction with structural measures.

(d) If there are measures that address specific objectives which will cause negative contributions to the EQ account, then, legislative actions to preclude those adversities could be considered as additional alternative management measures. For example, assume that one solution to a specific flood problem is the channelization of an unclassified scenic river. This measure provides significant negative contributions to the EQ account. Local legislation and inclusion of the river in the national wild and scenic rivers system could both be management measures to include in alternative plans to preclude channelization and, therefore, provide positive contributions to the EQ account.

(e) The management option of no-action; i.e., letting the "without" condition occur will be considered throughout the plan formulation process.

(f) The identification of management measures is an iterative activity. In the early iterations of the planning tasks, it will concentrate on identifying measures which address one or more objectives. Measures which address more than one planning objective could, for example, include set-back levees, floodwalls, land acquisition or zoning. These measures could provide flood damage reduction and, at the same time, preserve riparian habitat. Measures which address only one objective could, for example, include browse development, elimination of domestic livestock, and additional land acquisition. These measures could produce increased wildlife productivity.

(g) In later iterations of the planning tasks, identification of management measures will emphasize modification of management measures. The modifications may increase the degree of planning objective fulfillment or eliminate or decrease adverse environmental impacts. Modification of measures will include any actions that preserve the integrity of the resources that are threatened by the management measures. This type of modification need not relate to the needs and problems expressed in the planning objectives and will lessen the need for mitigation. Changing the alignment of a set-back levee to preserve a historic structure, relocating a reservoir upstream of a tributary with valuable spawning habitat, and adding intake levels to a reservoir intake structure for water temperature control are all examples of how measures might be modified.

(h) Mitigation measures will be determined after no additional modifications can be made to eliminate adverse impacts. As described in the regulations of the ER 1105–2–400 series, mitigation measures are measures that provide positive contributions to an account in order to compensate for negative contributions to the same account. Examples of potential mitigation measures to compensate for adverse impacts on a fishery below a proposed dam would include fish hatcheries, stocking programs and downstream habitat development and improvement. A trade-off analysis is inherent to all mitigation measures. As an example, a mitigation measure might be to convert 200 acres of low-grade upland game habitat to a more productive marsh habitat to mitigate for 150 acres of marsh habitat lost. The trade-off that has been accepted is that 200 acres of marsh habitat minus the 200 acres of upland game habitat is of equal value as the 150 acres of marsh habitat. Mitigation measures are dependent upon their acceptance, as such, by the public and other responsible agencies. Mitigation measures will be included in the alternative plans, as appropriate, and will be refined and modified in any subsequent iterations of the planning tasks.

§ 308.13 Formulating EQ oriented plans.

Candidate EQ plans address the planning objectives in a way that emphasize, more than any other plans, aesthetic, ecological, and cultural contributions. Candidate EQ plans will be formulated as an integral part of the planning process in Stage 2. This paragraph emphasizes the procedure in which candidate EQ plans are formulated. See paragraph 11, Part 310 of this chapter for information on designating an EQ Plan at the end of Stage 3 planning. The importance of the procedure is that it requires formulation of environmental oriented alternative plans that reflect EQ concerns.

(a) Candidate EQ plans will be formulated by combining compatible measures which address the range of objectives and which, in a preliminary evaluation, have only positive or neutral contributions to the EQ account. A measure, which has both positive and negative contributions to the EQ account and the positive contributions are, or could be, greater, will also be included. If two objectives, which if fulfilled would provide positive contributions to the EQ account, are in conflict with each other, management measures to address each will be included in alternative candidate EQ plans.

(b) Potential EQ plans need not partially or fully satisfy traditional water resources needs, such as navigation or flood control. Potential EQ plans must address (attempt to satisfy) such needs. Example: A navigation channel is proposed through a productive marsh area. There is no way to provide the channel without a net adverse EQ impact. The EQ plan, therefore, should not contain a navigation channel, but should contain a measure for preserving the marsh. In this way, a tradeoff is presented. Of course, plan modification to avoid or lessen adverse EQ impacts is appropriate for mixed plans.

(c) Candidate EQ plans will be modified to further address the planning objectives and increase net positive contributions to the EQ account during subsequent iterations of the planning tasks. In those iterations, some candidate EQ plans which show merit could be included in the planning process as separate alternative plans as well as being retained as potential candidate EQ plans. These plans would, therefore, not necessarily undergo additional modification to increase contributions to the EQ account at the sacrifice of contributions to the other accounts. In the process of plan modification, there may be cases where contributions to the NED account will be foregone to increase contributions to the EQ account.

(d) The concept of environmental quality includes an inherent preference for avoiding adverse impacts rather than compensating for them. In the formulation of candidate EQ plans, management measures would be modified to either eliminate or decrease adverse environmental impacts to the greatest extent possible. When it is no longer possible to eliminate negative contributions to the EQ account, then candidate EQ plans will mitigate adverse environmental impacts in kind. Measures which cause significant net negative contributions to the EQ account that cannot be compensated for through mitigation will not be included in candidate EQ plans.

(e) The planning process includes a responsibility to formulate plans which provide net positive contributions to the EQ account. It is possible, however, that no implementable measures can be identified to provide net positive contributions to the EQ account, as in the case of proposals to be implemented in areas which are already managed for the purposes of environmental preservation and enhancement. An alternative plan providing net negative contributions to the EQ account which cannot be mitigated will not be designated as the EQ plan.

(f) An EQ plan cannot be the same as a NED plan unless the management measures which form the plan provide positive contributions to the EQ account.

§ 308.14 Environmental considerations in other plans.

Concerns related to environmental quality shall be considered in all plans, including the NED plan.

(a) The NED plan can address planning objectives which reflect environmental problems and needs if no negative contributions to the NED account result from measures that address these objectives.

(b) Different combinations of measures that address specific planning objectives and provide both positive and negative contributions to both the EQ and NED accounts will be formulated into different alternative plans. These alternative plans will also include varying levels and combinations of measure modification and mitigation. In formulating candidate NED plans, mitigation measures may be included instead of modification measures when the financial cost of the modifications exceed the costs of the mitigation.

(c) Mitigation measures required by the planning contraints must be included as elements of all plans including candidate NED plans. Candidate NED plans should not include mitigation measures other than those required by the contraints including those in ER 1105–2–450 unless they provide either net positive or neutral contributions to the NED account. For example, the determination has been made that a specific cultural resource is eligible for nomination to the National Register of Historic Places. Proper mitigation for adverse impacts to this resource, as specified in a signed memorandum of agreement, must be included in the NED plan since the mitigation is required by a planning constraint. If the determination has been made that the resource is not eligible for nomination to the National Register, mitigation would no longer be designated by a constraint; and it would not be included in the NED plan. Other plans might include this mitigation.

§ 308.15 Effective date.

This regulation is effective, as published in the FEDERAL REGISTER on that date and codified as 33 CFR Part 308.

APPENDIX A—MANAGEMENT MEASURES

(To be added at a later date.)

PART 309—ENVIRONMENTAL CONSIDERATIONS: IMPACT ASSESSMENT OF ALTERNATIVE PLANS

Sec.

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Appendix A—Environmental Quality Impact Measurements
Appendix B—List of Assessment Methods

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778–24869, September 10, 1973.

§ 309.1 Purpose.

This regulation provides specific guidelines for conducting environmental impact assessment as an extension of ER 1105–2–240.

§ 309.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 309.3 References.

(a) Section 122, Public Law 91–611, *River and Harbor and Flood Control Act of 1970*, 31 December 1970, (84 Stat. 1818).

(b) Public Law 85–624, Fish and Wildlife Coordination Act of 1958 (P.L. 85–624), as amended, (16 U.S.C. 661 et seq.).

(c) ER 1105–2–200, Multiobjective Planning Framework (33 CFR 290).

(d) ER 1105–2–240, Impact Assessment (Task 3) (33 CFR 294).

(e) ER 1105–2–421, Environmental Considerations: Inventories and Monitoring (33 CFR 307).

(f) ER 1105–2–450, Environmental Considerations: Evaluation of Alternate Plans (33 CFR 310).

(g) ER 1105–2–XXX, Identification and Administration of Cultural Resources (40 FR 41636, Sept. 8, 1975).

(h) ER 1105–2–507, Preparation and Coordination of Environmental Statements.

(i) ER 1105–2–921, System of Accounts (33 CFR 393).

§ 309.4 Definitions.

The definitions presented in paragraph 4, ER 1105–2–200, and Part 307 of this Chapter are applicable to this regulation.

§ 309.5 Background.

Assessment of the social, economic and environmental impacts of alternative plans is an integral feature of the planning process. Significant effects identified and measured during the assessment will play a critical role in determining a plan's relationship to the planning objectives, plan evaluation and trade-off analysis. Describing and measuring impacts in the assessment process should not reflect societal preferences for maintaining or accomplishing environmental quality. These preferences are determined through the separate task of evaluation. Guidelines developed to meet the requirements of Section 122, Public Law 91–611, are given in Appendix A of ER 1105–2–240. ER 1105–2–240, consistent with the Water Resources Council (WRS) Principles and Standards provides guidance on impact assessment of the likely economic, social, and environmental effects of each alternative plan. This task includes the following activities: determining source of impacts, identifying and tracing impacts, specifying incidence of impacts and measurement of impacts. This regulation emphasizes the environmental considerations within the impact assessment process. To maintain consistency, the planning team will assure that the specific environmental effects designated in Appendix C, ER 1105–2–240 have been fully addressed.

§ 309.6 Planning policy.

(a) Assessment will be conducted to assure that full consideration has been given to the impacts of each alternative plan on the components of the National environmental quality objective. Impact assessment includes the identification and measurement of these impacts to the extent possible. Where quantification is not possible, impacts must be qualitatively characterized in a written statement.

(b) The same level of projections as used for the economic studies will be used for impact assessment to ensure consistency throughout the planning study. However, the period of analysis used for Environmental Quality (EQ) assessment may extend beyond the 50- or 100-year period used for other aspects of the assessment process.

(c) Impact assessment will be conducted by a multidisciplinary team. The environmental specialist(s) on the team will participate fully in the assessment efforts and will assure that full consideration of EQ resources is incorporated in the process.

§ 309.7 Coordination.

Impact assessment requires early and continuing coordination to develop a full interchange of views between the Corps of Engineers and appropriate local, State, and Federal agencies and the interested public.

(a) To assure that environmental quality considerations are fully considered in the assessment process, special coordination efforts will be initiated with those Federal and State agencies having legal jurisdiction or special expertise on environmental matters. Informal and formal exchanges with these agencies, along with other environmental conservation and public interest groups, should be initiated early in the impact assessment process and continued throughout this task. Consultation with these interests will assist in assuring that environmental effects have been fully identified, measured, or otherwise concisely characterized.

(b) To meet the requirements of the Fish and Wildlife Coordination Act of 1958, it will be necessary to assess fish and wildlife impacts for each alternative plan studied in Stage 3 development of detailed plans. These assessments must be coordinated and scheduled with the US Fish and Wildlife Service, National Marine Fisheries Service (where appro-

priate), and the State fish and wildlife agency, in order that the fish and wildlife resources may be considered in the selection of the recommended plan. In those project studies where fish and wildlife assessments are not provided by the Federal fish and wildlife agencies and/or State agency, the District Engineer will accomplish the necessary studies. Results of such studies will be coordinated with the Federal and State agencies. Detailed guidance for coordination with the Federal Fish and Wildlife agencies is provided in ER 1105–2–163 (draft).

(c) Coordination must also be initiated with the Advisory Council of Historic Preservation when alternatives affect properties listed on the Register of Historic Places or known properties eligible for listing on the Register. Overall guidance for Corps responsibilities and coordination procedures for the cultural resource program is provided in ER 1105–2–460.

§ 309.8 Relationship of impact assessment to evaluation and mitigation.

Impact assessment is an objective analysis conducted to identify and measure the likely economic, social, and environmental effects of each alternative plan. Each alternative plan, as well as the "without" condition, will be compared to the base condition to determine expected change. This will provide the necessary information for comparing the "with" and "without" conditions in the assessment task. The objective difference between the "with" and "without" conditions will thus be calculated and displayed based on the measurements carried out in impact assessment. However, the "with" and "without" analysis, that is, determining the beneficial or adverse value of expected plan induced change, will be carried out in the evaluation task. Adverse impacts, as measured from the "without" condition will be the basis for mitigation.

§ 309.9 Relationship of impact assessment to planning stages.

(a) *General.* Developing plans in three stages requires increasing the level of detail for proper assessment of the alternative plans. The assessment reflects increasing precision as it is conducted during the later iterations of the planning tasks in Stage 2 and throughout Stage 3, and will be compatible in detail with other study activities.

(b) *Stage 1.* Precise alternative plans will not be formulated during the first stage. Assessment will be limited to a preliminary screening process of the management measures to identify potential beneficial and adverse contributions to the four accounts (i.e. National Economic Development (NED), Environment Quality (EQ), Social Well-Being (SWB), and Regional Development (RD)). A profile of significant existing conditions, abstracted from information furnished by the comprehensive resource inventory will be developed. Where practical and relevant, all environmental impacts wil be assessed to the same level of detail.

(c) *Stage 2.* This stage emphasizes the formulation of potential courses of action or alternative plans for managing resources in the study area. Assessment should be conducted for each alternative plan to the level of detail sufficient to identify major alternations of existing conditions and differences between the alternative plan and the "without" condition. Consequently, at this stage the assessment concentrates on identifying the significant effects. An inordinate level of detailed study is not envisioned; however, the assessment and related evaluation should enable the planner to screen out from the array of candidate EQ plans those which have unmitigable adverse impacts on environmental quality.

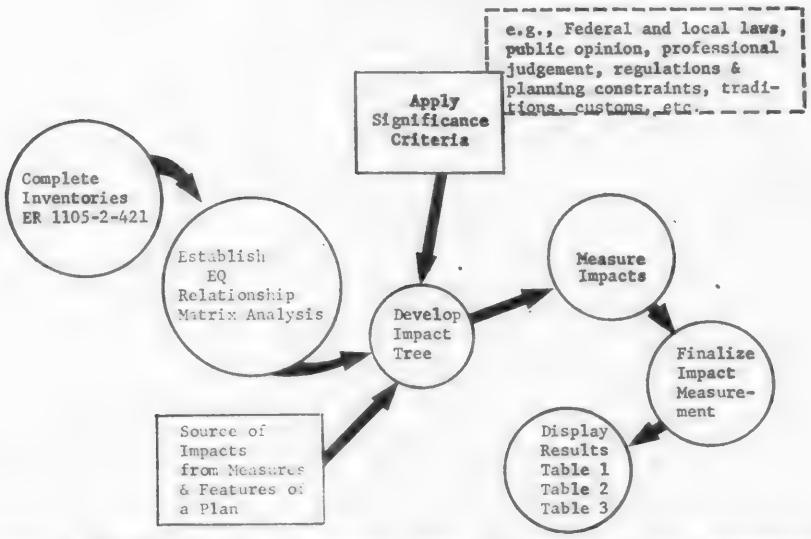
(d) *Stage 3.* (1) In the final stage, emphasis is placed on modifying the remaining alternative plans to produce detailed implementable plans. Assessment at this stage requires planning information that is specific and well defined. Detailed assessment should be conducted to identify all environmental impacts, including the location and expected time of occurrence. Each of the alternatives should be described in sufficient detail so that impacts can be displayed with comparability.

(2) Impact assessment at Stage 2 should have identified those components of environmental quality that would receive major alteration for each alternative studied. This analysis provides a sufficient basis for determination of general environmental effects for each alternative. While the features of the affected environment may be basically the same for each alternative as identified during Stage 2 assessment, a more detailed assessment of a lesser number of alternative plans is needed at Stage 3. The objective of assessment in this latter stage is to obtain an accurate estimation of the expected impacts on environmental quality needed to foster public understanding.

§ 309.10 Overview of impact assessment process.

Figure 1 presents an overview of the activities necessary in assessment of alternatives. The following paragraphs discuss the activities included in assessment.

Figure 1 - Overview of Impact Assessment Process


e.g., Federal and local laws, public opinion, professional judgement, regulations & planning constraints, traditions, customs, etc.
Apply Significance Criteria
Complete Inventories ER 1105-2-421
Establish EQ Relationship Matrix Analysis
Develop Impact Tree
Measure Impacts
Finalize Impact Measurement
Source of Impacts from Measures & Features of a Plan
Display Results Table 1 Table 2 Table 3

§ 309.11 EQ Considerations in identifying and analyzing existing relationship of elements.

(a) The environment is composed of many natural and man-made elements which interact with each other in various ways to form human perceptions of environmental quality. Prior to initiation of the assessment process, the environmental resources inventory will be analyzed to determine the existing relationship between water and related resources and amenities (both natural and man-made) which comprise the physiographic, biological and cultural components of the EQ objective. Examples of various elements include distinctive landforms, vegetation types, critical habitat of endangered flora and fauna, historic sites, thermal pollution sources, shoreline or streambank erosion, etc. A representative categorization of environmental elements is provided in Appendix A, Part 307 of this chapter.

(b) A theoretical relationship among some environmental elements can be shown by the following example: Slope, rainfall, and other basin features determine the amount of water in a stream, while the material in the streambed, the pattern of the stream, and debris influences the streamflow. Streamflow characteristics, in turn, are critical in determining aquatic habitat for benthic organisms and fish. For example, streamflow affects habitat through its influence on channel shape through bank erosion and on stream pattern through possible scour and deposition. Similar relationships exist between other elements that occupy the same environment.

(c) The planning team must be aware of the relationships among the elements and their significance, as a first step in assessing the impact of an alternative plan. To assist the impact assessment process in terms of environmental quality considerations, the following specific guidelines are given:

(1) The planning team will identify and analyze the relationship among the natural and man-related activities within the study area which appear to control or affect the components of the National environmental quality objective.

(2) These relationships will provide information to be used in assessing the ecosystem's response to natural changes and man-made changes either directly or indirectly associated with the alternatives.

(d) To the extent that these relationships are accurately defined, the subsequent task of impact identification and tracing will be eased. It also assures that significant environmental effects will be considered.

(e) Because of the complex interaction among elements, it is difficult to aggregate all the relationships into a form that can be used in the planning process. An environmental matrix, while not required, may be useful in accomplishing this task.

(1) The environmental relationship matrix is developed by identifying various environmental elements for the specific planning area. (As developed from using Appendix A, Part 307 of this chapter or refinements thereof.) The elements are grouped by subject (physiographic, biological, cultural, and land use) and displayed in matrix form as suggestively depicted in Figure 2. Both the columns and the rows should contain identical elements.

(2) In analyzing the environmental relationship matrix, the columns act upon rows. Those elements listed along the top of the matrix are "active", those

listed down the side of the matrix are "acted upon". For example, within the study area, channel slope is always determined to some degree by runoff, sedimentation, erosion and soils. The row, channel, slope, is acted upon by the columns headed runoff, sedimentation, erosion, and soils. The relationship between two elements must be determined. Three levels of relationship consisting of slight, moderate, and critical should be designated. For instance, if in the project area the soils are stable, then the relationship between soils and erosion would be judged as slight. If, in the study area, the amount of stream valley vegetation is limited and has high value to terrestrial animals, the relationship between stream valley vegetation and terrestrial animals would be judged as critical. These relationships are indicated in the column with the appropriate notations. The primary relationships are defined in this way for all elements in the planning area. The relationships can then be used in the identification and tracing of effects.

Figure 2

ENVIRONMENTAL RELATIONSHIP MATRIX

ELEMENTS ACTED UPON ↓ / ACTIVE ELEMENTS →		PHYSIOGRAPHIC						BIOLOGICAL					CULTURAL				LAND USE				
		Channel Slope	Runoff	Sedimentation	Erosion	Soils	Ground Water	Strm. Valley Veg.	Forest	Endangered Habitat	Terrestrial fauna	Aquatic fauna	Paleontological	Historical	Archeological	Contemporary	Utilities	Residential	Commercial	Industrial	Transportation
PHYSIOGRAPHIC	Channel Slope		C	C	S	C															
	Runoff					S	S	M	M		S						S	M			
	Sedimentation		M		M			M									S				
	Erosion		M			M	S														
	Soils			S	S		M	M	C												
	Ground Water	S	M			C															
BIOLOGICAL	Strm. Valley Veg.		S		S		S				C						S	S			S
	Forest																				
	Endangered Habitat						C	C												M	
	Terrest. Fauna				S		S	S	M			M					S	S			
	Aquatic fauna	M	C	M	S	C		C	C								S				
CULTURAL	Paleontological																				
	Historical		S								S						S	S			
	Archeological		S														S	S			
	Contemporary																				
LAND USE	Utilities		S															S			
	Residential		C	S			C				S					S					
	Commercial						M						C								
	Industrial						C														
	Transportation				S																

Legend
Relationship between elements in Study areas.

S - Slight
M - Moderate
C - Critical

NOTE.—This example is for illustrative purposes only. A large number of elements should be added to the matrix (See Appendix A, Part 307 of this chapter for List of Elements). The general relationship between elements in the specific area are hypothetical for display purposes. (See Appendix B of this ER for list of representative methods, particularly items 6, 15 and 17 on matrix analysis.)

§ 309.12 EQ considerations in determining sources of impacts.

(a) Overall guidance for determining sources of impacts is presented in ER 1105–2–240. Historically, water resource plans generally have been conceptualized as resulting in structural output such as dams, levees, floodwalls or related structural measures. There are now other measures considered in water resource plans beside these, and their source as an environmental impact must be identified. Features such as pumping plants, transmission lines and substations for hydropower dams are potential sources of impacts on the environment. In some case, roads must be built into roadless areas for access to the damsite and/or reservoir area. Often extensive preliminary drilling and other exploratory work must take place to determine feasibility. Therefore, significant features of an alternative plan must be taken into account to determine source of impacts.

(b) In determining sources of environmental impacts, a checklist should be developed to identify potential sources of impacts for all phases of an alternative (i.e., planning, engineering and design, construction, operation, and maintenance). Impacts may result from the following causal factors: project inputs, construction, operation and maintenance activities; project output; and project induced human activities. Consequently, each category must be considered to ascertain proper identification of potential impact sources. All sources of impacts must be adequately identified to determine the alternatives' affect on environmental quality. A suggested list of factors causing impacts is included in Appendix B, ER 1105–2–240.

§ 309.13 EQ Considerations in identification and tracing of impacts.

(a) The objective of this activity is to assure that significant impacts which affect environmental quality are identified. For each alternative plan, the sources of potential impacts are compared to the base conditions over the life of the project to determine if a change, either direct or indirect, can be predicted as a consequence of the implementation of the plan. This requires tracing the course of each causative source of effects to determine specific impacts. Cause and effect analysis should be completed to the point that all likely impacts are identified. The relationship matrix as described in § 309.11e can be consulted for assistance in the identification of impacts, and to keep account of the cause and effect relationship.

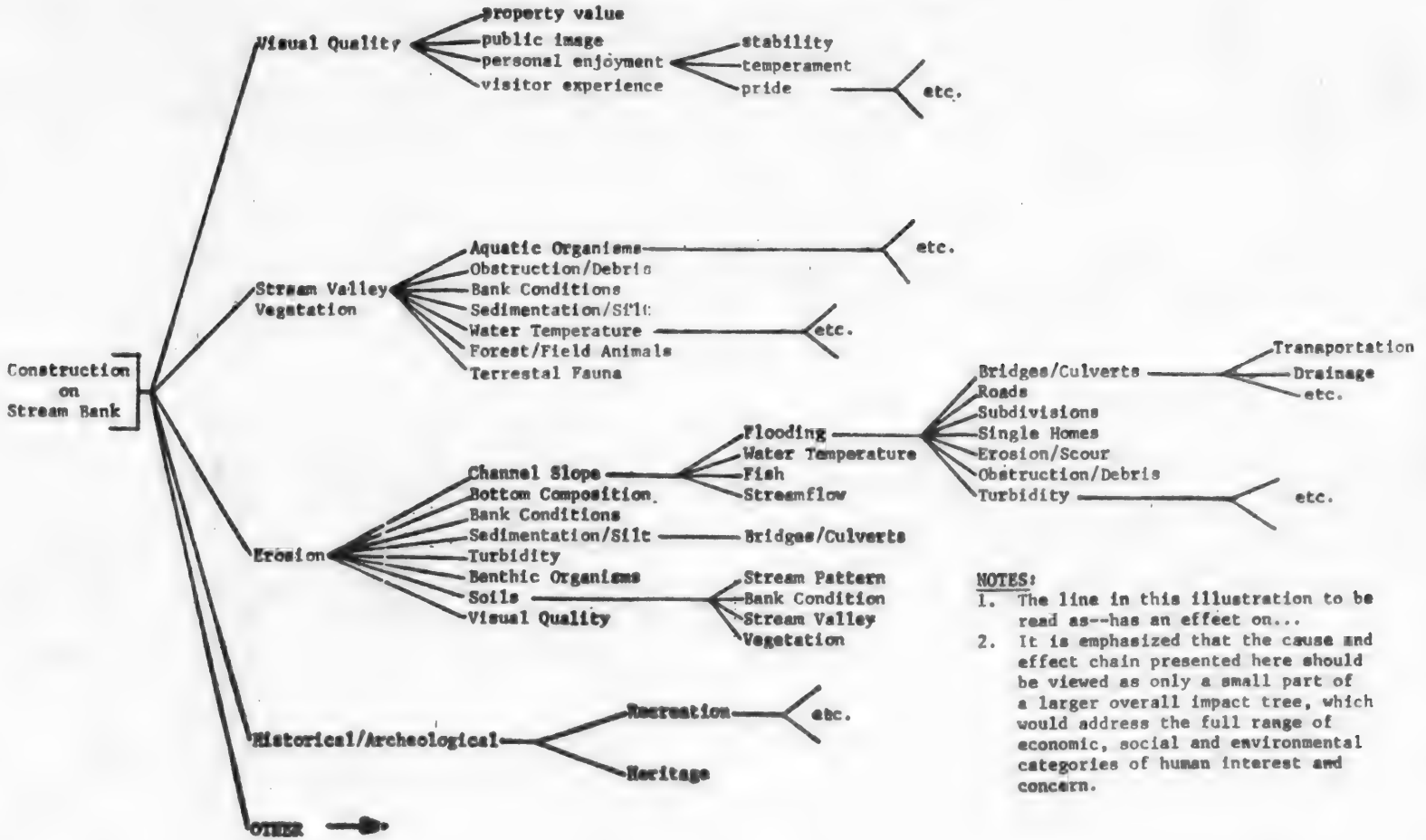
(b) The direct and indirect impacts on environmental quality associated with alternative plans should be considered within and external to the study area. Using the example of constructing a flood control reservoir 50 miles upstream of an ocean, the reservoir could trap sediment and prevent beach nourishment along the shore; which, over time, would adversely impact shoreline esthetics, public use and area biology. The impacts associated with the construction of the reservoir, along with the impacts downstream from the project area, must be identified. In this way, the notion of overall impacts on environmental quality can be identified. Guidance on geographic scope of the planning study is provided in ER 1105–2–200 and Part 310 of this chapter.

(c) A useful assessment tool for identifying and tracing cause and effects, is that which is commonly called an impact tree. By delineating all direct cause and effects, a sequence of interactions can be traced to provide a framework for identifying impacts, thus helping to chart the chain of impacts. The important thing is to ensure that all significant effects, direct or indirect, have been identified. A limited portion of an impact tree is shown in Figure 3.

(d) The chain of effects could go on almost indefinitely through a detailed complex web of minute interactions. However, boundaries for cause and effect interactions must be established in the impact assessment process. Most cause and effect chains do not conclude with obvious endpoints; therefore, application of significant criteria is needed for ending each chain and determining which effects should be pursued in more detail. The general rule in determining the end of the chain should be at that point where a significant effect is identified and itself causes no further impacts. The decision to stop or continue a chain of cause-effect analysis will be determined by the planning team in conjunction with public involvement inputs.

(e) A summary of the impacts for each alternative measures on study area environmental resources can effectively be displayed in summary as shown on Table 1. The management measures should be listed across the top of the table and the study area environmental resources down the side. Environmental features impacted by the measures would be noted. Information for the table could be taken from the impact tree or other cause and effect analysis. The summary table would allow for information to be recorded clearly and succinctly. The table should show the interaction of the study area environmental resources as perceived by the public and alternative management measures in a very straightforward and obvious fashion. The summary table would visually depict a general comparison of each alternative management measure's effect on study area environmental resources. This table is not initially intended to show the measurement, incidence, or significance of the impacts. These will be reported in Table 2 or 3 as described in § 309.16. However, since Tables 2 and 3 are more detailed and complex in nature and primarily intended for technical use, Table 1 can be made to summarize and display measurement and significance for public communication purposes.

Figure 3. Impact Tree For a Hypothetical Bank Stabilization Project
(Example for Illustrative Purposes)



NOTES:

1. The line in this illustration to be read as--has an effect on...
2. It is emphasized that the cause and effect chain presented here should be viewed as only a small part of a larger overall impact tree, which would address the full range of economic, social and environmental categories of human interest and concern.

§ 309.14 Determination of environmental significance.

(a) An environmental effect is significant if it is of obvious public interest and/or would be likely to have a material bearing on decision-making. This determination is primarily subjective, because there are no definitive criteria which can be used for all cases. However, the planning team will consider all available technical information, including the scarcity, fragility or resiliency of the environmental elements in the study area, as well as public opinion, existing law, etc. to assist in making a determination as to whether an effect is significant.

(b) In each planning study, criteria should be developed which will assist in determining significant impacts. Some suggested examples are as follows:

(1) An effect is significant if it implies a reduction of a threatened or endangered species of flora or fauna.

(2) An effect is significant if its magnitude is above (or in some cases below) a specified tolerance. Here magnitude is a function of intensity and duration, and priority.

(3) An effect may be insignificant if it is only temporary while it exists; provided the former condition will be restored or improved.

(4) An effect should be treated as significant if it is of obvious public concern.

(5) The probability of the effect actually occurring should also be considered in determining significance. For example, if it is certain that the effect will occur it could be significant. In those cases where the probability is less than 50%, but not clearly defendable, it must be assumed that it will happen unless proved contrary and, therefore, should not be considered insignificant on probability criteria alone.

(6) An effect should be treated as significant if it violates an existing law, traditions, local customs, or established policy.

§ 309.15 EQ considerations in measurement of impacts.

(a) Measurement or quantification of similar effects is required in terms of common standards. To provide some degree of consistency in measurement of impacts, the planning team will make initial attempts to quantify environmental impacts in terms of quality indicators for the physiographic, biological, cultural, and esthetic resources. Some examples include: acres of critical habitat, water quality indices, ecosystem density and diversity, key species population, historic importance, landscape drama, composition, etc. The standardized set of EQ impact measurement units presented in Appendix A should be of assistance. These EQ impact measurement units will receive priority in impact assessment; however, other measurement units may be used if clearly defined. When an impact cannot be quantified, it should then be thoroughly described in qualitative terms.

(b) The relationship between project impacts and the "without" condition will be determined in the assessment process. The measurement of change should reflect gains or losses to the existing condition. The measurement of impacts is the difference between the plan and the without condition. The beneficial or adverse nature of these positive or negative influences will be ascribed in the plan evaluation task and will be based on public perception, technical knowledge and professional judgment.

(c) In the measurement of EQ impacts, care should be exercised when utilizing a numerical approach where numbers are assigned to describe the magnitude of impact. An example would be where an impact is assigned a value from 0 to 10 to measure its relative magnitude. However well-designed, such methods are necessarily subjective. It must be emphasized that all environmental impacts will be quantified where possible to be consistent with established units of measurement. The numerical approach could be used to quantify EQ resources where presently there are on commonly accepted units of measurement. An example is in assigning quantitative estimates to aesthetic factors. When properly conducted for some specific resources, the numerical approach could provide useful measurement information if conducted by a qualified multidisciplinary team. However, this approach is considered unacceptable to assigning numbers to impacts for various aesthetic, biological and physical resources to determine a single overall EQ rating for each alternative plan. Application of impact assessment employing a numerical approach is given in Item 20 of Appendix B.

§ 309.16 Categories of impacts.

(a) The assessment process should identify the category for each impact associated with alternative plans. The first category (Type I) are the direct, unavoidable consequences over time of the proposed alternative plan; the second category (Type II) are those impacts which are associated directly with the intended output of the alternative plan over time; and the third category (Type III) consists of related induced impacts over time by plan inputs or outputs.

(b) For example, consider a levee project in an agricultural area where bottomland hardwood trees are an important environmental resource. The physical construction of the levee requires the immediate loss of 300 acres of trees. The "without" condition projection indicates that 200 acres would be lost anyway due to conversion to farm lands. The Type I loss is 300 acres of bottomland hardwood trees. The probability that some or all of the trees would have been lost eventually without the project is irrelevant, since all future options are foreclosed.

(1) The project will provide flood protection, thereby allowing 700 acres to be converted to soybeans. However, the "without" condition projection indicates that 500 acres would have been converted anyway. The Type II environmental impact would be the loss of 200 acres associated with the output of the project, since all future options are not foreclosed. The likelihood that 500 acres will convert even without the project is, therefore, relevant.

(2) The increased soybean production will cause a soybean processing plant to be built and, in turn, encourage additional farmers to move into the area resulting in additional land clearing. This is a Type III impact; the "without" condition is relevant.

(c) It is critical that these impacts be measured from the existing condition and compared to the "without" condition. The measurement and understanding of the relationship of these impacts throughout the planning period serve a vital function in the subsequent evaluation stage.

§ 309.17 Levels of display.

(a) To keep account of the various activities of impact assessment (source of impacts, identify and trace, specific incidence, and measure impacts), it is advisable to develop a bookkeeping mechanism. Two suggested examples of tables which generally describe how the various activities can be displayed are presented. Table 2 would show the plan measure, impact source, impacts, category of effect, location, timing, duration, probability and reversibility. Table 3 would present the measurement of impacts. Information may be extracted from the tables for presentation to the public for their response. Significant impacts will be accounted for in the System of Accounts as outlined in ER 1105–2–921.

- TABLE 1 -

SUMMARY OF MANAGEMENT MEASURES AND
THEIR EFFECTS ON ENVIRONMENTAL RESOURCES
IN SKAGIT RIVER STUDY AREA

ENVIRONMENTAL RESOURCES 1/	MANAGEMENT MEASURES 2/ Bank Stabilization	Flood Plain Management	Channelization,	etc. →
I. PHYSIOGRAPHIC				
Geologic				
The Grandy Slide	X 3/	●	X	
Bacus Hill Quarry	X	X	X	
Hydrologic				
Free Flowing River	X	?	X	
Gage's Slough	X	X	X	
Wiseman Creek Falls	● 4/	X	X	
II. BIOLOGICAL				
Botanical				
The Grady Slide	X	X	X	
Zoological				
Anadromous Fish Run	● 4/	●	X	
Critical wildlife habitat	X	X	X	
Debay Slough	●	X		
Lower Skagit River	X	X	etc.	
III. CULTURAL				
Archeological				
Chobahan blish Village Site	X	etc.		
Sbaleoch Village Site	●			
Skagit Delta Indian Site	●			
IV. LAND USE				
Environmental Use Areas				
Natural Flood Plain	X			
Propose wild and Scenic River	X			

1/ Environmental resource features, as perceived by the public, known to exist within the study area.
2/ A series of management measures should be listed relevant to study objectives.
3/ In this simple illustration the X is used to indicate that an effect would occur on that related resource, but makes no attempt to quantify positive or negative impacts.
4/ This symbol is used to show that no impact is anticipated.

- TABLE 2 -

IDENTIFICATION OF ENVIRONMENTAL IMPACTS OF MANAGEMENT MEASURES

PLAN MEASURE	IMPACT SOURCE	IMPACTS a	b	c	d	Type of EFFECT 1/	LOCATION 2/	TIMING YRS. 3/	DURATION SHORT/or LONG 4/	PROBABILITY 5/	REVERSIBILITY 6/
Bank Stabilization	Construction on bank	Loss of Visual quality				I	PA	0-5	Long	50-60%	Irr.
		Removal of stream valley vegetation				I	PA	0-1	Long	100%	Irr.
			Reduce Aquatic Organisms			I	PA	0-5	Long	70-80%	Irr.
			Increase Water Temperature			II	PA	0-1	Short	60-70%	Rev.
			etc.								
		Decrease Erosion				II	RA	15-20	Long	90-100%	Irr.
			Lessen Channel Slope			II	RA	20-50	Long	40-50%	Irr.
				Reduce Flooding		etc.	RA	0-5	Short	90-100%	Irr.
				etc.	Reduce Turbidity						
					etc.		etc.	etc.	etc.	etc.	etc.

1/ Type I = direct, unavoidable consequences of the alternative plans. Type II = consequences directly related to the intended output of the alternative plans. Type III = related induced consequences.

2/ Describes location of impact such as: (PA) = Within the planning area, (RA) = Within the remainder of the study area. (LA) = Within a larger affected by the plan. (RN) = Within the rest of the Nation.

3/ Timing is an expression, which indicates a range of when the impact is expected to occur after plan implementation.

4/ Duration: short = 1-10 years; Long = 10 years and beyond.

5/ Probability is a numerical expression, not necessarily mathematically computed, which represents technical knowledge and professional judgement as to the likelihood of occurrence.

6/ (IRR.) = Impact is Irreversible (REV.) = Impact is Reversible.

- TABLE 3 -

MEASUREMENT OF SIGNIFICANT IMPACTS OF ALTERNATIVE PLANS

(1) IMPACTS (SIGNIFICANT EFFECTS)	(2) UNITS	(3) BASE 1/ CONDITION	(4) FUTURE WITHOUT 2/ CONDITION	(5) CHANGE IN BASE CONDITION WITHOUT PLAN	(6) FUTURE WITH PLAN	(7) CHANGE IN 3/ BASE CONDITION WITH PLAN	(8) NET EFFECT OF PLAN 4/ ON FUTURE WITHOUT CONDITION
Removal of Stream valley vegetation	Acres	20,000	9,000	-11,000	5,000	-15,000	-4,000
Aquatic Organisms reduction ---------- etc.--------→							
Increase Water Temp. ------ etc. ------→							
↓ etc. ↓							

1/ Base Condition. Describes existing conditions in quantity of measurement units.
2/ Future Without Condition. Projection of resource condition in units as determined by Problem Identification task (ER 1105-2-200) should be identified. Highest or Lowest level of the resource will be indicated. However, this column could be subdivided into various time periods (eg. 25,50,75 or 100 yrs.) to show the without condition over time.
3/ Change in Base Condition With Plan. Describes the plan's impact on base condition.
4/ Net Effect of Plan on Future Without Condition. Columns (7-5) describes net effect of plan over the without plan change.

§ 309.18 Effective date.

This regulation is effective, as published in the FEDERAL REGISTER on that date and codified as 33 CFR 309.

APPENDIX A—ENVIRONMENTAL QUALITY IMPACT MEASUREMENT UNITS

(Standardize List of Environmental Quality Impact Measurement Units will be developed by special OCE effort.) This effort will require one year or more to complete.

APPENDIX B—LIST OF ASSESSMENT METHODS

The following List is a Representative Sample of Various Assessment Methods. It must be noted that some of the methods cover both assessment and evaluation. Overall guidance on evaluation is presented in ER 1105–2–450.

Dee, Norbert et al., Environmental Evaluation System for Water Resources Planning, report to the U.S. Bureau of Reclamation, Columbus, Ohio: Battelle Memorial Institute (January 1972).

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Leopold, Luna B., et al., A Procedure for Evaluating Environmental Impact, Geological Survey Circular 645, Washington: Government Printing Office (1971).

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Stover, Lloyd V., Environmental Impact Assessment—A Procedure, Miami, Florida, Sanders and Thomas, Inc. (1972).

Tulsa District, US Army, Corps of Engineers, "Matrix Analysis of Alternatives for Water Resource Development," Technical paper (July 31, 1973).

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Jain, R. K., L. V. Urban and G. S. Stacey, Handbook for Environmental Impact Analysis. US Army Construction Engineering Research Laboratory, Technical Report E–59, Champaign, Illinois, April 1974, pp. 106.

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Washington Environmental Research Center, US Environmental Protection Agency, Aesthetics in Environmental Planning. Washington, D.C., November 1973, pp. 187.

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Jordan, J. "A Philosophy of Environmental Impact Assessment." Journal of Soil Conservation. Vol. 28, No. 5, September/October 1973, pp. 205–207.

H. Jesse Grove, "Recreation and Aesthetics Evaluation," Chapter 8 in Bad Creek Environmental Study by B. C. Dysart III, et al., prepared for Duke Power Co., Charlotte, N.C., 15 June 1973.

D. W. York, B. C. Dysart III, and L. W. Gahan, Multi-Objective Water Resources Planning: Methodolgy to Achieve Compatibility Between Environmental Amenities and Economic Development, Report No. 55, Water Resources Research Institute, Clemson University, Clemson, S.C., May 1975.

PART 310—ENVIRONMENTAL CONSIDERATIONS: EVALUATION OF ALTERNATIVE PLANS

Sec

310.1 Purpose.
310.2 Applicability.
310.3 References.
310.4 General.
310.5 Period of analysis.
310.6 The planning team.
310.7 EQ considerations in evaluation of planning objective fulfillment.
310.8 EQ considerations in evaluating contributions to the system of accounts.
310.9 EQ considerations in applying specified criteria.
310.10 EQ considerations in trade-off analysis.
310.11 Designating the EQ Plan.
310.12 EQ considerations in designating the NED Plan.
310.13 EQ considerations in reiterating planning tasks.
310.14 Effective date.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778–24869, September 10, 1973.

§ 310.1 Purpose.

This regulation provides specific environmental guidance on the evaluation of alternative plans as an extension of ER 1105–2–250.

§ 310.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 310.3 References.

(a) Public Law 91–190, National Environmental Policy Act of 1969 (83 Stat. 852).

(b) Section 122, Public Law 91–611, River and Harbor and Flood Control Act of 1970 (84 Stat. 1818).

(c) Water Resources Council, Principles and Standards for Planning Water and Related Land Resources (P&S), 38 FR 24778–24869, 10 September 1973.

(d) ER 1105–2–200, Multiobjective Planning Framework (33 CFR 290).

(e) ER 1105–2–220, Problem Identification (33 CFR 292).

(f) ER 1105–2–230, Formulation of Alternatives (33 CFR 293).

(g) ER 1105–2–240, Impact Assessment (33 CFR 294).

(h) ER 1105–2–250, Evaluation (Task 4) (33 CFR 295).

(i) ER 1105–2–507, Preparation and Coordination of Environmental Statements.

(j) ER 1105–2–291, System of Accounts (33 CFR 393).

§ 310.4 General.

Evaluation of alternative plans is a vital link in the planning process. It provides both planner and decision maker with specific information concerning the effectiveness of a plan in addressing the water and related land resource problems. It also provides important information on the public's perception and acceptance of the planning effort. Environmental considerations in plan evaluation are particularly crucial to the success of the entire planning effort. Both NEPA and the P&S mandate that full environmental consideration will be employed in the planning process to enhance, preserve, and protect the quality of the environment to the fullest extent possible. This regulation provides guidelines to assure that environmental considerations in the formulation of alternative plans, or lack thereof, are surfaced, evaluated, and where missing, incorporated. The evaluation task will assure input of environmental considerations during early stages of the planning process, redirecting plan-formulation to incorporate additional environmental input, when needed.

§ 310.5 Period of analysis.

The period of analysis used for Environmental Quality (EQ) evaluation can be Independent of the period used for other aspects of plan evaluation (ER 1105–2–250). A plan's significant contributions to the EQ account, either beneficial or adverse, may extend or occur beyond the 50- or 100-year period used for the evaluation of other contributions. This is especially critical in evaluating irreversible commitments of EQ resources. Specification of the EQ period of analysis, if different from that being used for the other evaluation effort, will be made in the System of Accounts.

§ 310.6 The planning team.

The evaluation of alternative plans will be conducted by a multidisciplinary planning team. The environmental specialist(s) on the team will participate fully in all plan evaluation efforts to assure that environmental concerns are given full and equal consideration.

§ 310.7 EQ considerations in evaluation of planning objective fulfillment.

Overall guidance for determining the relationship of project induced changes to planning objectives is provided in ER 1105–2–250. Planning objectives are water and related land resource management needs (opportunities and problems), specific to the study area, that can be addressed to attain the national EQ and/or National Economic Development (NED) objectives. Planning objectives direct plan formulation in solving water and related land resource problems. To assure full EQ consideration in evaluation of plans which address the planning objectives, the following specific guidelines are given:

(a) Significant environmental impacts (from Impact Assessment) are compared to the planning objectives to determine any relationships. To identify relationships and evaluate degree of contribution, the planning objectives should be translatable into specific non-monetary units, such as miligrams per liter oxygen, hectares of marsh, or miles of scenic river. Consequently, a planning objective to improve the oxygen level (in mg/l) of stream X can be related to the change in oxygen levels (mg/l) provided by removing excessive Biochemical Oxygen Demand (BOD) with a wastewater treatment system. If the plan significantly increases the oxygen level in stream X over the "without" condition and maintains this contribution over the period of analysis, a high degree of planning objective fulfillment has been attained.

(b) Significant environmental changes with a plan are compared to projected "without" conditions for the same resources in impact assessment. This will identify long-term relationships between the alternative plans and future environmental conditions. This relationship will show whether or not specific environmental resource management needs expressed in the planning objectives can be fulfilled by the plan. For example, a planning objective is to improve oxygen levels over the existing condition in stream X, a highly polluted stream. Plan A will initially increase oxygen levels 4 mg/l over the existing condition, a significant change. However, nonpoint sources will continue degrading oxygen conditions until, by year 2000, the plan's influence on oxygen levels will only maintain the existing level, which was already highly polluted and below State standards. Planning objective fulfillment has been only partially obtained, even though the "without" condition was improved.

(c) The full range of a plan's significant environmental changes will be utilized in the evaluation of planning objective fulfillment. Planning objectives will address environmental needs specific to the study area but attainment of the needed resource management must contribute positively to the EQ objective.

(d) The public will be informed of relationships between the study's planning objectives and the national EQ objective, as defined in Principles and Standards (P&S). Relationships between a plan's significant environmental impacts and planning objective fulfillment will be presented and explained to the public for their concurrence or to resolve any disagreement or misunderstanding.

§ 310.8 EQ considerations in evaluating contributions to the system of accounts.

Overall guidance for evaluating a plan's contributions to the P&S System of Accounts (SA) is provided in ER 1105–2–250. Specific guidelines for preparing the SA are provided in ER 1105–2–921.

(a) *Impact Analysis.* Significant impacts are analyzed to decide if they are beneficial or adverse. The full range of significant impacts will be displayed in the pertinent accounts. The impacts are compared to determine the best plan(s) and to identify contributions to the national objectives and other accounts. The EQ and Social Well Being (SWB) contributions are measured in non-monetary and usually dissimilar units, making comparisons difficult. For evaluating contributions to the EQ account, it may be helpful to group similar or closely related impacts (from a measure common to all plans being compared) and identify a "common denominator" shared by all the impacts. This is generally only useful for two or three impacts that are critical to the decision makers. If the impacts, for example, all result in loss of fish, this "common denominator" could be used to simultaneously compare effects of a number of impacts caused by similar measures.

(b) *Break-point Analysis.* It may be desirable to employ a "break-point" analysis to contain evaluation efforts within reasonable and productive limits. Break-point analysis can also be used to redirect plan formulation more efficiently in the reiteration process. Essentially, break-point analysis identifies sudden changes in "value" of additional units of an output in relation to additional "costs" incurred in producing the added output. For the EQ account, the intrinsic "value" of increased units of an EQ contribution can be compared to the "costs" in resources committed or management opportunties foregone to produce the contribution. Where there is a significant change in the relationship between the "incremental value" and the "incremental cost," it may be possible that increasing the EQ contribution beyond this point is no longer justifiable or desirable. For example, reducing BOD in stream X by 10 mg/l will require converting 2000 hectares of woodlands to grassland for land treatment of wastewater. Further reduction of BOD by another 5 mg/l requires only 100 more hectares of woodland. However, overall reduction of BOD by more than 15 mg/l will require an additional 500 hectares of woodlands for each additional mg/l of BOD reduction. A high public value was placed on BOD reduction by 13 mg/l to meet State standards. Achieving an additional output of BOD reduction by 2 mg/l "costs" little more in additional land commitment. However, to increase the EQ contribution by reducing BOD a total of 17 mg/l would be very "costly" in commitment of woodlands without a correspondingly high value associated with the increased output. The break-point at 15 mg/l could direct plan formulation to cease output of BOD reduction at 15 mg/l and avoid the additional loss of woodlands, even though it would be possible to continue increasing positive contributions to one component of the EQ account. The evaluation effort would also be reduced.

(c) *EQ in the NED Account.* Careful examination will be made of any relationships between environmental impacts and economic contributions to the NED account. For example, diminution of a fish run may result in economic losses (loss of fisherman days). This loss must be quantified and counted as an adverse NED impact. The environmental specialist(s) will work closely with the economic specialist(s) in verifying monetary contributions attributed to environmental resources.

(d) *EQ in the EQ Account.* Detailed comparison will be made between significant environmental impacts and their effects on components of the EQ objective. Particularly critical are those contributions that relate to dynamic physical, chemical, and ecological processes maintaining vital life support systems for man and other important biological communities. The role of processes such as seasonal flooding, tides, nutrient cycling, weathering, or biological succession must be carefully evaluated in light of significant project impacts. Natural air and water purification systems are other life support elements that must be looked at closely. Additionally, the availability and quality of aesthetic and cultural resources is, among others, essential determinants of our quality of life. The influence of significant environmental impacts on these resources are, therefore, a very important evaluation consideration. The environmental specialist(s) on the Planning Team must assure full consideration of all aesthetic and cultural aspects in this evaluation effort. Similarly, all contributions of environmental impacts that could irreversibly commit any of the EQ resources underlying components of the EQ objective must be fully identified and accounted for in the EQ account.

(e) *EQ in the Regional Development (RD) Account.* As stated in ER 1105–2–921, the contribution of impacts to the EQ account are "regionalized" in Table 2 of the SA. This eliminates the need to account for regional environmental impacts in the RD account. Where possible, and relevant to the decision on plan selection, contributions of environmental impacts to other RD components must be determined. For example, environmental quality may have influence of regional employment, business, and industrial activity. Similarly, environmental quality has a direct influence on the value of regional recreation; e.g., where fish and game populations, water quality, aesthetics, etc., are of high quality, associated recreational development is worth more. The environmental specialist(s) on the planning team will

again assure that full and accurate representation is given to contributions of environmental impacts in the RD account; of course, the extent of such analysis will be limited by the state of the art. Close coordination with the economics specialist will be necessary.

(f) *EQ in the SWB Account.* Environmental contributions to the SWB account will relate principally to public health, education, and recreation. Environmental impacts that affect numbers and kinds of disease vectors or nuisance organisms will be carefully evaluated in this account where possible and relevant to the decision on plan choice. Similarly, impacts affecting air and water quality can have very significant influences on human health and well-being. Educational opportunity is also an important component of the SWB account. Natural areas of high quality are in great demand for scientific and educational uses. When this type of area is affected by an alternative plan, the impact's contribution to the SWB account must be fully evaluated. Environmental quality also affects recreational quality and opportunity. When impacts contribute to the quality of the environment, e.g., aesthetics, biological populations, air and water quality, etc., then they can also be greatly influencing recreational opportunity. Detailed analysis must be made of any environmental contributions to this component of the SWB account.

(g) *EQ Resources.* Several EQ resources are particularly critical to the EQ objective. These resources involve endangered species, cultural elements, air and water quality, various rivers, seashores, parks, refuges, etc., that are of unique natural, cultural, or aesthetic value. These resources are inextricably tied to the health and quality of man's life and sufficient national attention has been focused on them to require passage of Federal laws to protect and enhance their values. Where these resources occur in a study area, their protection is paramount in the EQ objective. When any of these resources are adversely affected, the plan or measure responsible must be reformulated to eliminate the adverse contribution. If the adverse impact cannot be eliminated, through plan modification or agreement on mitigation with legally responsible agencies, the plan or measure will be dropped from further consideration, regardless of other beneficial contributions to the NED or EQ objectives. EQ resources of critical national significance are:

(1) Habitat designated critical for threatened or endangered species by the US Departments of Commerce and Interior;

(2) Sites on, or eligible for nomination to, the National Register of Historic Places;

(3) Air and water quality as defined by State and Federal Standards; and

(4) Environmental, aesthetic, and cultural use areas such as parks, monuments, refuges, rivers, seashores, forests, etc., established by State or Federal law.

§ 310.9 EQ considerations in applying specified criteria.

Overall guidance for applying specified evaluation criteria is presented in ER 1105–2–250. The specified evaluation criteria further test the value and responsiveness of alternative plans in solving water and related land resource problems. When plans are not responsive to the criteria, reformulation will be necessary to resolve the conflict. To assure full EQ consideration in applying the specified evalution criteria, the following guidelines are given:

(a) *Acceptability.* The acceptance of a plan by concerned publics must be determined. Where a significant segment of the public believes strongly that the plan will adversely affect components of the EQ objective, then reiteration will specifically address and attempt to resolve adverse environmental aspects while maintaining the basic orientation of the plan. Determination of acceptability will be based on public input.

(b) *Completeness.* A "complete" plan incorporates all actions necessary to implement the plan. Where plans enhance environmental quality, comparison will be made between investments and actions needed to accomplish the enhancement and those that are actually in the plan and could be implemented should the plan be recommended and authorized. Where enhancement of environmental quality will require extensive investments or actions by other agencies, or where future actions must be separately authorized, the plan is essentially "incomplete." Reiteration shall address specific inclusion of the needed actions, including detailed obligations of others.

(c) *Effectivess.* The technical performance of a plan in attaining planning objectives will be evaluated in light of "state of the art" techniques for sound environmental planning in water resources development. Measures that enhance the EQ objective will reflect up-to-date thinking of the professional environmental sector.

(d) *Efficiency.* A plan's efficiency is measured by its ability to achieve planning objectives in the least-cost way. Costs are generally considered in terms of dollars. For EQ purposes, however, "costs" can also be non-monetary commitments of resources that are lost to society. Irreversible and irretrievable commitments of EQ resources will be considered as environmental costs and will relate to the plan's efficiency. Lost resource management opportunities are also "costs" that affect a plan's efficiency.

(e) *Certainty.* The certainty of a plan is the likelihood that planning objectives will be achieved should the plan be carried out. Identifying certainty involves two different criteria: (1) determining that there is enough information and data on hand to be able to predict impacts and attainment of planning objectives, and (2) determining if the project is sufficiently operational to attain the planning objectives. Early in the planning process, careful analysis must be made of available data and significant data gaps. An analysis must be made between data needed to identify potential EQ impacts and the data available. It may be necessary to collect additional data before further planning efforts are continued. This evaluation can save considerable and expensive planning efforts from being misallocated. The operational certainty of a plan achieving planning objectives must also be evaluated. Where alternative plans contain separable EQ enhancement measures, not inextricably related to traditional project purposes, an analysis will be made of the institutional and implementation requirements necessary to actually carry out these measures. Evaluation will be made of the plan's non-Federal cost sharing requirements and the history of non-Federal support for participating in environmental enhancement programs in the study area. Where considerable non-Federal participation will be required to enhance the EQ objective, the overall certainty of attaining related planning objectives may be affected. This determination will be fully addressed in the evaluation of alternative plans.

(f) *Geographic Scope.* The geographic area to be studied for impact assessment should be large enough to encompass actual, significant environmental (and other) impacts. In some cases, e.g., inland navigation, the area to be studied may be very large, because impacts are widespread. The geographic area for problem identification should be large enough to encompass a reasonable set of alternative plans, from which a final plan will be selected. This area will generally be smaller than the area for impact assessment.

(g) *NED B/C Ratio.* Economic benefits in relation to economic costs are determined. NED elements that are affected by the quality of the environment (mandays of hunting or fishing, commercial fishing, water-oriented recreation, etc.,) will be included in the NED B/C evaluation. Input from the US Fish and Wildlife Service, National Marine Fisheries Service, Bureau of Outdoor Recreation, and other agencies with responsibility in this area will be sought early in the planning process and will be incorporated in the evaluation.

(h) *Reversibility.* The degree to which a given alternative plan, after full or partial implementation, could be reversed and the impacted areas restored to approximate the "without" condition is determined. Where impacts irreversibly degrade components of the national EQ objective, the plan will be considered irreversible. Particular attention must be given to *cumulative* effects of environmental impacts. While a single impact may not be considered irreversible, the cumulative effect of a number of similar impacts from this and other projects could push a resource past a critical threshold or reversibility.

(i) *Stability.* A plan's stability represents the range of alternative futures

that can be accomodated by the plan's output of services. The degree of "certainty" in obtaining environmental goals in the alternative futures and the degree of "uncertainty" (para 21, ER 1105–2–921) related to the plan's environmental impacts on each alternative future relate strongly to the stability of the plan.

§ 310.10 EQ considerations in trade-off analysis.

Basic guidance for incorporating trade-off analysis in the plan evaluation task is given in ER 1105–2–250. In trade-off analysis, the contributions of each plan are compared so that what is gained or foregone by choosing a given alternative plan over other alternatives is clearly set forth. Public involvement in trade-off analysis is crucial. Decisions must be made that could affect the day-to-day lives of study area residents.

These decisions must be made based on the active participation and input by local citizens. Study personnel must, however, evaluate the national interest in all trade-off decisions. To assure that full consideration of environmental quality is incorporated in the trade-off analysis, the following guidelines are given:

(a) All significant contributions to components of the national EQ objective will be displayed and presented to the public. Where possible, EQ impacts will be shown in numerical terms to emphasize the magnitude of the contribution and to facilitate comparison.

(b) In addition to displaying all significant EQ contributions, the public must be shown which environmental resource management needs or opportunities are being gained or foregone by choosing a given alternative. A useful tool for displaying these EQ gains or losses is the "preference set." Preference sets can be valuable vehicles for fully involving the public in the decision-making process, allowing them to contribute to the critical trade-off decisions concerning their community's environmental quality. While the preference set is a public participation tool, it can be useful in displaying trade-off analysis in the study report especially for localized projects such as flood control. One possible preference set sequence follows:

(1) Selection of plan X indicates that residents of the study area prefer the following levels of EQ attainment:

(i) Specify degree of management, protection, enhancement, or creation of areas of natural beauty and human enjoyment;

(ii) Specify degree of management, preservation, or enhancement of valuable cultural, physical, or ecological resources or systems;

(iii) Specify degree of enhancement of land, air, and water quality;

(iv) Specify degree of enhancing other EQ components not listed above.

(2) By accepting the above levels of EQ attainment, study area residents must be willing to forego the following resource management opportunities: specify environmental, economic, and social resource management opportunities that will be foregone by achieving levels specified in (1) above.

(3) To achieve the above levels of EQ, study area residents must be willing to make the following commitments:

(i) Specify actual EQ resource commitments that will be required;

(ii) Specify significantly adverse EQ impacts that are key determinants in the trade-off decisions;

(iii) Specify actual economic commitments and costs that will be required;

(iv) Specify actual institutional changes that will be necessary;

(v) Specify expected social conflicts in the study area as a result of EQ attainment;

(vi) Specify expected social conflicts in the study area as a result of EQ attainment.

(4) In light of the above commitments and assumptions, is the alternative plan, as presently proposed, acceptable to the concerned public?

(5) If the alternative plan, as presently proposed, is not acceptable, what changes should be made?

(c) Public input to the trade-off analysis will surface alternative plans that are most environmentally acceptable to the local citizens. It will also identify needed changes in planning objectives or plan formulation.

§ 310.11 Designating the EQ Plan.

Overall guidelines for designating the EQ Plan are given in ER 1105–2–230 and ER 1105–2–250. An EQ Plan is one that addresses a study's planning objectives in a way that best emphasizes aesthetic, ecological, and cultural contributions. National environmental policy mandates that, among ther things, important cultural and natural aspects of our national heritage are preserved and a diverse and varied environment is maintained. Consequently, designation of an alternative plan, as the EQ Plan implies that the plan best enhances and protects the aesthetic, cultural, and natural diversity of the environment. The minimum requirement for designating a plan from the final array of alternative plans as the EQ Plan is that it must make a net positive contribution to the EQ account when compared to the "without" condition. EQ Plans must also be viable, implementable, meet evaluation criteria, and not violate planning constraints.

(a) An EQ Plan will be designated on the basis of the following priorities:

(1) Designate the alternative plan which provides maximum positive contributions to one or more components of the EQ account and makes no significant adverse contribution to any component of the EQ account which is not mitigated in kind.

(2) Where it is shown that the above cannot be done, then designate as the EQ Plan the alternative plan which provides the greatest net positive contributions to the EQ account. This plan can include mitigation measures and EQ losses can be offset by EQ gains.

(3) In some planning studies it may not be possible to designate an EQ Plan given the minimum requirement in paragraph 11 of this section. If and when an EQ Plan cannot be designated, the attempt to do so will be clearly supported and documented. In such cases, the plan that most nearly meets the minimum requirement will be identified and labeled as the "EQ Oriented NED Plan".

(b) Designation of an alternative plan as an EQ Plan will be subject to the following criteria or constraints:

(1) The "no action" alternative will not be designated as the EQ Plan. A "no action" alternative provides no more positive contribution to the EQ account than does the "without" condition.

(2) No alternative plan will be designated as an EQ Plan that contains measures which cause adverse modification of a natural, free-flowing stream or river having significant environmental value.

(3) No alternative will be designated as an EQ Plan that contains measures that degrade wetlands having significant environmental value.

(4) The planner may find it necessary to place upper limits on the level of EQ enhancement attained by an EQ Plan. An analysis should be conducted to determine a candidate EQ Plan's "NED reasonableness." This analysis is to identify any significant "break-points" where NED costs in producing the EQ output increase significantly without significant increases in the EQ output. For example, there will be a point when the cost of an incremental increase in the amount of dissolved oxygen in a stream becomes extremely costly; or the cost of an incremental increase in the Ph of an acid stream becomes extremely costly.

§ 310.12 EQ Considerations in designating the NED Plan.

Overall guidelines for designating the NED Plan are given in ER 1105–2–230 and ER 1105–2–250. Since the P&S requires equal national signficance be given to environmental quality and national economic development, planning should address' both national objectives and avoid developing polar conditions between the two. Because EQ and NED are co-objectives, there should be NED reasonableness in the EQ Plan and EQ reasonableness in the NED Plan. EQ reasonableness in designation of an alternative as the "NED Plan" will be based upon the following considerations and constraints (see § 310.8g):

(a) No alternative designated the NED Plan will cause the following adverse environmental impacts:

(1) Destruction or degradation of critical habitat for threatened or endangered species, as designated by the US Departments of Commerce and Interior;

(2) Destruction or degradation of archeological or historical sites on, or considered eligible for nomination to, the National Register of Historic Places without a signed Memorandum of Agreement with the Advisory Council on Historic Preservation, the National Park

Service, and the State Historical Preservation Officer;

(3) Degradation of air or water quality below State or Federal Standards, or below existing conditions if already less than these Standards.

(4) Destruction or degradation of environmental quality in any Federal, State, or local governmentally established environmental use area (wilderness areas, refuges, parks, rivers, scientific-educational areas, etc.), without full agreement between all affected agencies.

(b) Satisfactory elimination or mitigation of the above classes of adverse environmental impacts, concurred in by legally responsible agencies, will enable an alternative plan to be eligible for NED Plan designation.

§ 310.13 EQ Considerations in reiterating planning tasks.

General procedures for the reiteration of planning tasks are provided in ER 1105–2–250. Planning tasks are reiterated for alternative plans that have been designated as NED, EQ, and "mixed NED/EQ" plans. Reiteration is to (1) develop plans in more detail to more fully address the planning objectives, (2) reduce significant adverse impacts, (3) in special cases, increase RD and SWB benefits, and (4) meet specified evaluation criteria. Reiteration of plan formulation will provide a mechanism for improving the environmental responsiveness and public acceptance of the plans.

(a) An important aspect of reiteration is development of means to eliminate or lessen significant adverse environmental impacts. There are two ways to consider adverse impacts while addressing planning objectives. Plans or measures can be modified to reduce their intended outputs, resulting in reduction or elimination of the plan's adverse impact on the environment. This is to retain or preserve the existing affected resource. Measures can also be added to plans to mitigate, or compensate, for losses of existing resources, while maintaining the plan's original outputs. Plans will first be modified to eliminate adverse EQ impacts in order to retain existing EQ resources. If plan modification cannot eliminate the impacts, then mitigation measures will be developed to compensate for lost EQ resources. The decision of which adverse impacts must be eliminated or reduced will incorporate professional judgment and public input. Retention of existing EQ resources is preferred over compensation for lost resources.

(b) Reiteration will follow steps outlined in paragraph 11a, ER 1105–2–250. Reconsideration of applicable management measures is required to identify any new measures or systems that can eliminate adverse EQ impacts and still address the planning objectives. When new measures cannot eliminate adverse EQ impacts, each overall plan may be modified so that NED benefits are foregone in order to reduce EQ adversities or vice versa. Reduction of a plan's adverse impacts on EQ may be accomplished by a reduction in scope of the plan. This will be reflected in following iterations of Impact Assessment. When the alternative plan can no longer make net positive contributions to the NED objective, no further trade-offs may be made to avoid adverse EQ impacts.

(c) Plan modification to eliminate adverse EQ impacts will be subject to the following considerations for the EQ & NED plans:

(1) Candidate EQ plans will be modified in an attempt to eliminate all significant adverse EQ impacts prior to designation as the EQ plan. Retention of existing EQ resources is paramount. Mitigation is acceptable only to the extent that other EQ resources are not adversely affected.

(2) Candidate NED plans will be modified to eliminate adverse EQ impacts only to the extent that incremental NED dollar benefits equal or exceed NED incremental dollar costs to an acceptable degree.

(d) When identification of new measures or plan modification does not eliminate all significantly adverse EQ impacts, mitigation measures can be identified and evaluated. Mitigation is compensation for EQ resources or management opportunities lost to society as a result of implementation of a plan. Formulation of mitigation measures will be guided by the following considerations:

(1) To the extent possible, loss of EQ resources will be compensated with "in-kind" resources. Where in-kind resources are not available, closely related resources may be considered. As a minimum, EQ losses will be mitigated only by other EQ resources; e.g., loss of wetlands will not be mitigated by development of a golf course.

(2) Mitigation of EQ losses must not result in significant degradation or irreversible commitment of other valuable EQ resources.

(3) Where it is not possible to mitigate EQ losses with other EQ resources or significant degradation may occur to another EQ resource, a decision must be made to either eliminate the alternative plan or to forego mitigation entirely as a trade-off.

§ 310.14 Effective date.

This regulations is effective ----------, as published in the FEDERAL REGISTER on that date and codified as 33 CFR Part 310.

[FR Doc.77–5244 Filed 2–22–77;8:45 am]